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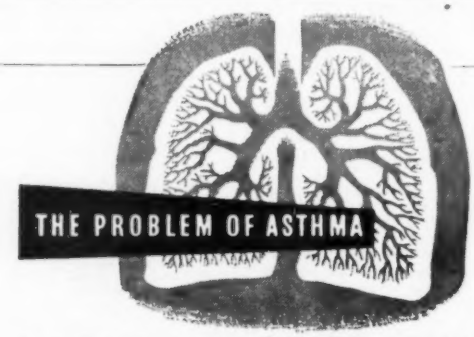

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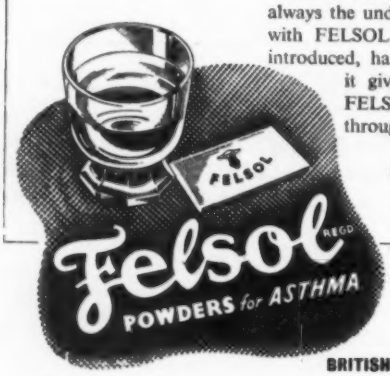

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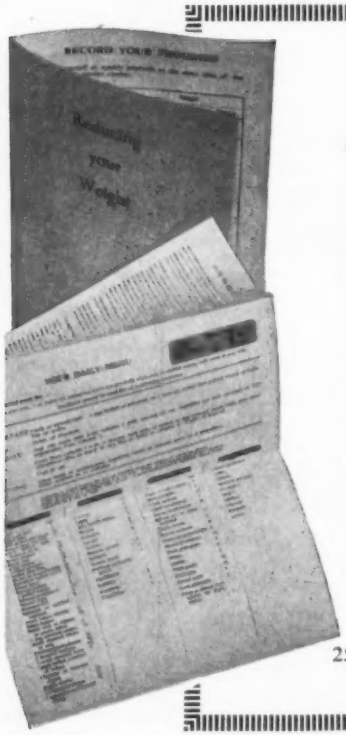

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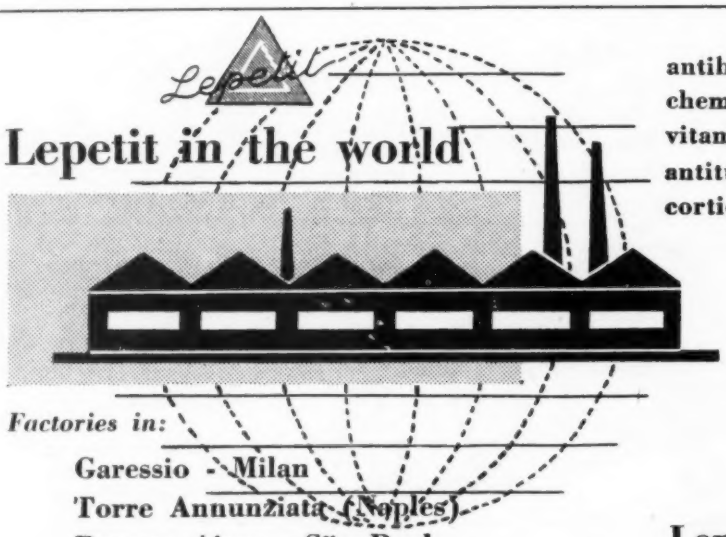

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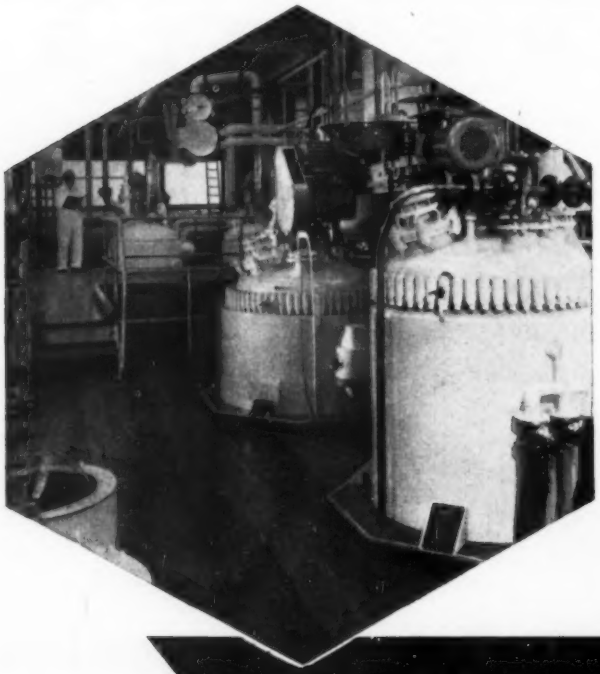

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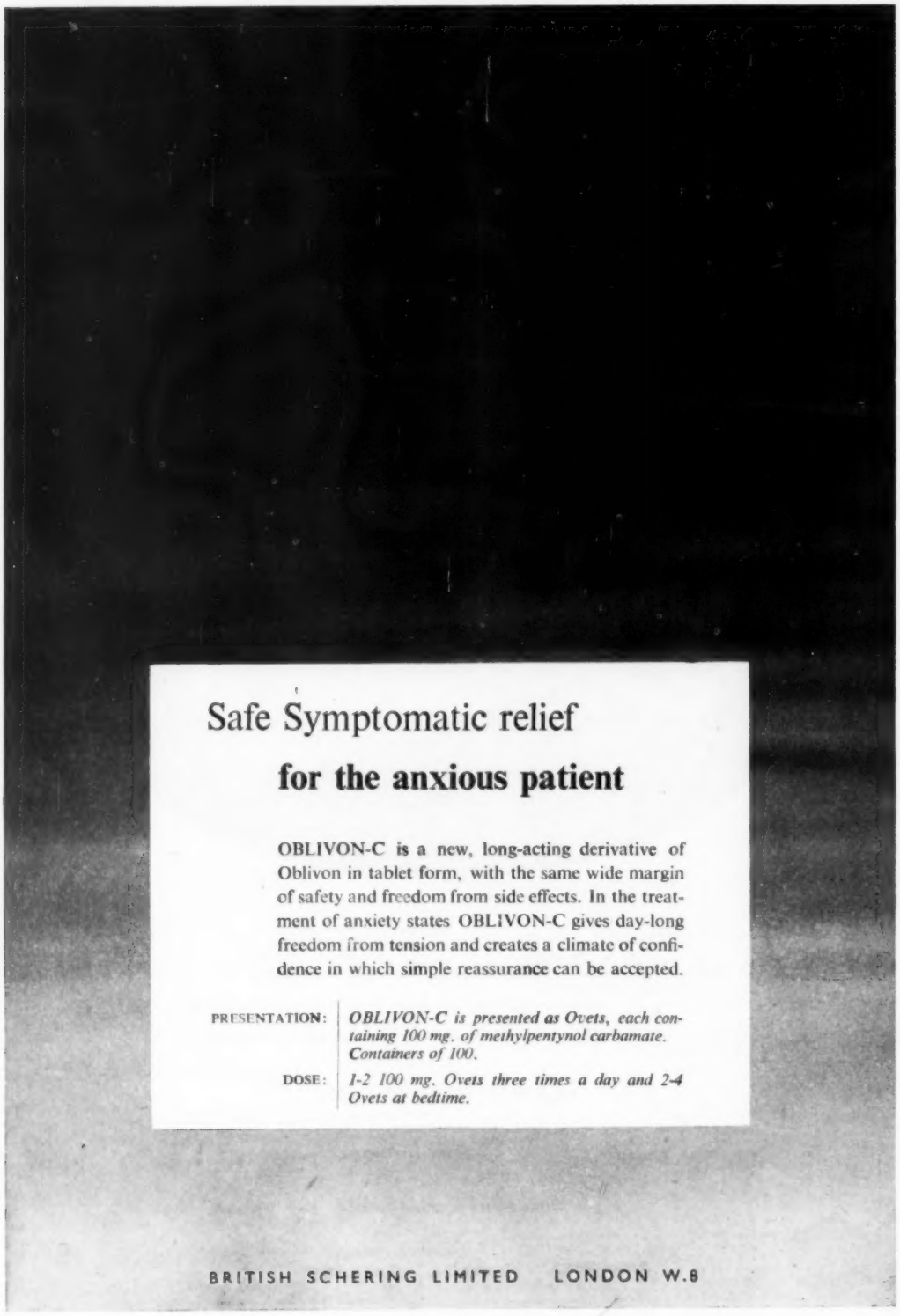
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TANCOLIN is indicated for treatment of the distressing and irritating cough associated with the common cold, Bronchospasm Bronchitis and Inflammatory and Catarrhal affections of the Respiratory Tract.

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Some may require a second course, but few will need a third.

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TACE

is available in green capsules (each containing 12 mg. chlorotrianisene dissolved in oil) in bottles of 60 and 300.

1. *Wis. med. J.* (1954) **53**:322.
2. *Amer. J. Obstet. Gynec.* (1954) **2**:201.
3. *J. Indiana med. Ass.* (1954) **47**:989.
4. *J. Clin. Endocr.* (1954) **14**:272.

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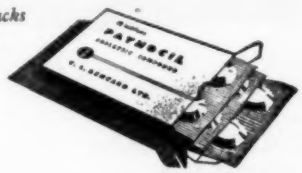

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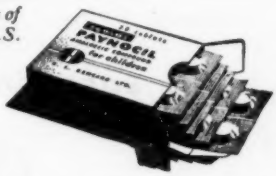

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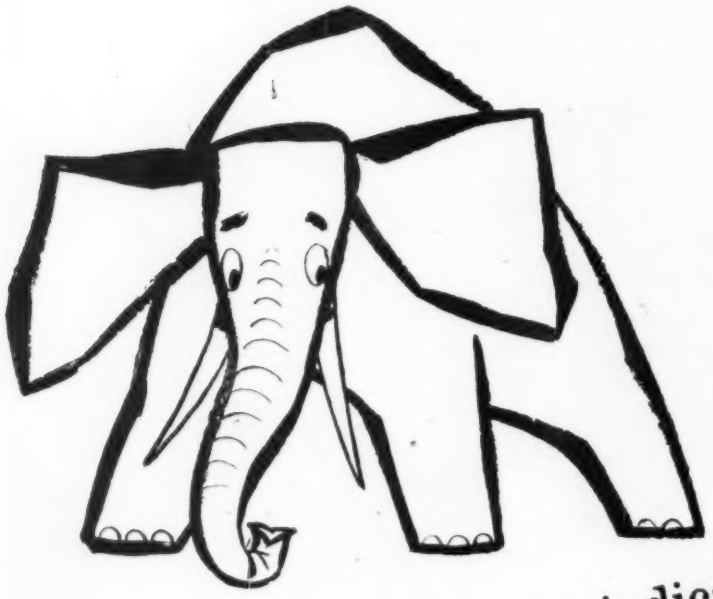

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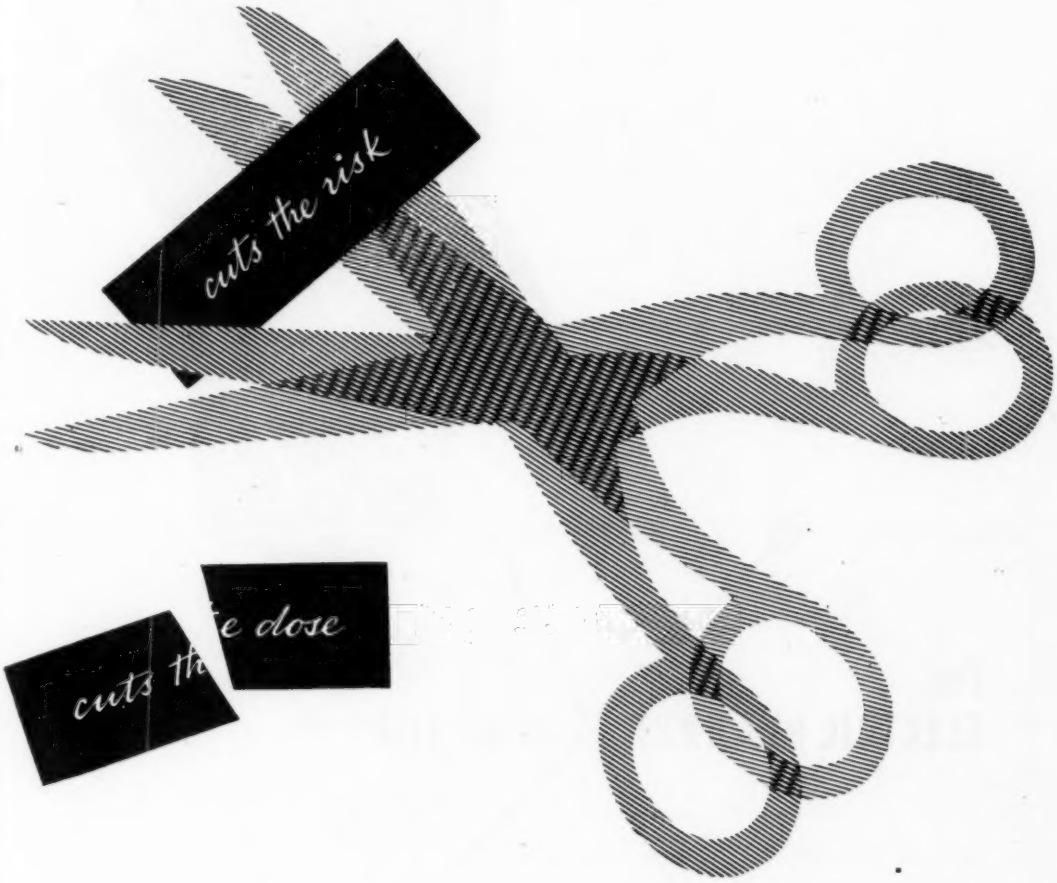

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Nulacin tablets are not advertised to the public, have no B.P. equivalent, and may be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to Pharmacists is 2/-.) Also available in tubes of 12.

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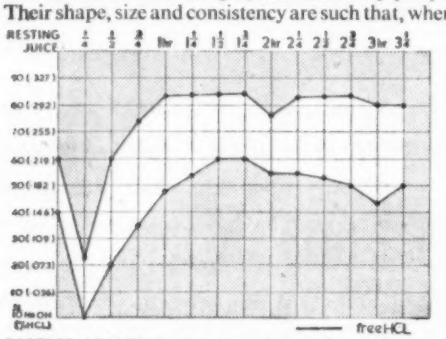
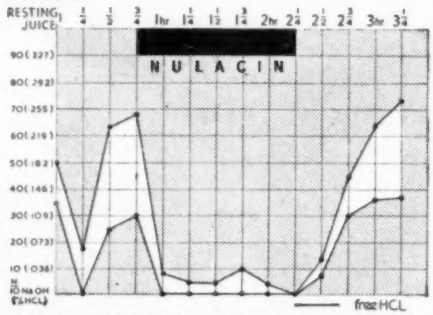


GASTRIC ANALYSIS. *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*



GASTRIC ANALYSIS. *Same patients as in graph on left, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

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The Control of Gastric Acidity. *Brit. Med. J.* 26th July, 1952, **2**: 180-182. Medical Treatment of Peptic Ulcer. *Med Press* 27th February, 1952, **227**: 195-199. Notes on Remedial Agents. *Med. Rev.* September, 1952, **46**: 162. Discussion on Peptic Ulceration. *Proc. Roy. Soc. Med.* May 1953, **46**: 354. The Effect on Gastric Acidity of "Nulacin" tablets. *Med. J. Aust.* 28th November, 1953, **2**: 823-824. Control of Gastric Acidity by a New Way of Antacid Administration. *J. Lab. Clin. Med.* 1953, **42**: 955. Further Studies on the Reduction of Gastric Acidity. *Brit. Med. J.* 23rd January, 1954, **1**: 183-184. Clinical Investigation into the Action of Antacids. *The Practitioner* July, 1954, **173**: 46. Management of Peptic Ulceration in General Practice. *Med. World* December, 1954, **81**: 591-601. Ambulatory continuous Drip Method in the Treatment of Peptic Ulcer. *Amer. J. Dig. Dis.* March, 1955, **22**: 67-71. Notes on Remedial Agents. *Med. Rev.* October, 1955, **49**: 142. Antacids in Peptic Ulcer. *The Practitioner*, January, 1956, **176**: 103.

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and similar eczematoid conditions especially when secondary infection is present

[1] "*Advances in the Treatment of Skin Diseases*" "*The Practitioner*", October 1955

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If you are not already aware of the advantages of 'Hydroderm' (hydrocortisone, neomycin and bacitracin, in an emollient base), please ask for literature and professional package for clinical trial.

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Diddle diddle dumpling, my son John,
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Wish we had some Lipect, my son John.

LIPECT *Cough Elixir*

PACKS: Bottles of 4 fluid oz.

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'Romicil' is easily absorbed, and high concentrations are obtained in the tissues; it is well tolerated, and is not destroyed in the alimentary tract.

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Deltacortril, despite its intensified potency, is relatively free from side-effects.

DELTACORTRIL will be available for prescription on E.C.10 on the 1st February, 1957. Tablets of 1 mg. will be available in bottles of 100, and scored 5 mg. tablets in bottles of 10, 20, 100, 500 and 1,000.

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In recent years, advances have been made in the study of grass pollens and hay fever and seasonal asthma. The new "Pollergen" resulted from these advances. Literature concerning it will be sent on request, and inconvenience will be avoided if physicians who used the old "Pollergen" will kindly make sure that they receive the literature on the new preparation.

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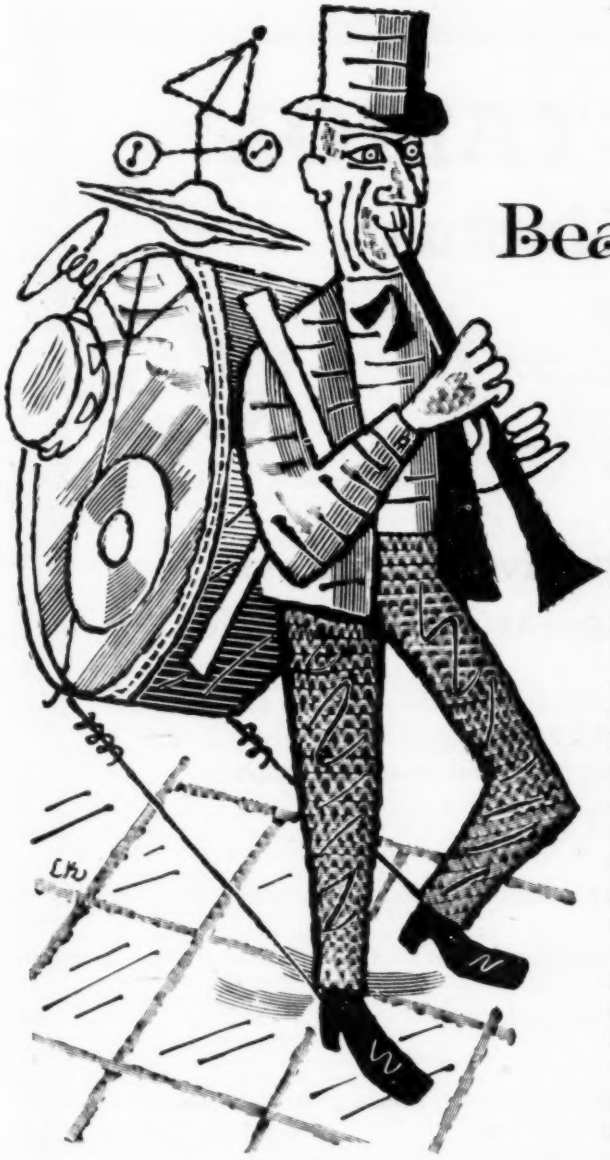

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- Free from soporific, nauseating, constipating or toxic effects.
- Contains no opiates or their derivatives.
- Pleasant tasting and well-tolerated.

The active constituent of Pectamol Linctus is the citrate of the diethylaminoethoxyethyl ester of α:α-diethylphenylacetic acid ('Oxeladin'). Each teaspoonful (3.55 ml.) contains 10 mg.

Dosage: 1 or 2 teaspoonfuls four times a day.

Basic N.H.S. Price: Bottle of 60 ml. 2/6.

Descriptive literature and specimen packings will be supplied on request.

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PORTACAVAL ANASTOMOSIS

R. MILNES WALKER
M.S. Lond., F.R.C.S.
PROFESSOR OF SURGERY IN THE UNIVERSITY OF BRISTOL

With illustrations on plate

IN a previous communication (Walker 1952) the opinion was expressed that venous shunts had a definite place in the treatment of portal hypertension, and that an end-to-side portacaval anastomosis was the most satisfactory if it could be done. As a result of further experience, definite indications for the operation were laid down (Walker 1954), and since that time there has been no reason to modify these indications or the type of operation then advocated. Now that more than 50 patients in this department have survived the operation and some of them have been followed for five years or more, the time seems appropriate to review the results.

Indications for Operation

The indications adopted may be set down precisely. Hæmorrhage from œsophageal or gastric varices due to intrahepatic venous obstruction, and the risk of such hæmorrhage when large varices are present, are the only indications. Certain contra-indications may exist in patients who have had such hæmorrhage. For example, the liver function may be too severely impaired, the portal vein may be thrombosed or "cavernomatous" and therefore unsuitable for such an anastomosis, or in elderly patients the risk of subsequent thrombosis may be considered too great.

These indications and contra-indications can now be reviewed in greater detail. That the hæmorrhage comes from varices may be suspected by finding that the patient has an enlarged spleen or ascites, but their presence is usually confirmed radiologically or, on occasions, by œsophagoscopy. If varices are present, it may be presumed that they are the source of the bleeding, but in some cases a peptic ulcer is present also, and then it may be very difficult to decide which is the cause.

That the venous obstruction is intrahepatic is not so easy to demonstrate, but previous jaundice, ascites, and impaired liver function suggest intrahepatic disease. Extrahepatic obstruction, however, may be present at the same time, from thrombosis in the portal venous system. It is here that transsplenic portal venography plays an important part in the investigation and selection of these patients because it will indicate the site of the obstruction and show whether the portal vein is sufficiently healthy for the operation (fig. 1). This investigation was made on all the patients operated on since 1952 except one who had had his spleen removed. The state of the portal vein was indicated so clearly that, in every patient but one in whom the operation was planned, it was possible to complete the anastomosis.

The exception was a woman, aged 66, who in 1948 had a cholecystectomy and three years later further exploration of her common bile-duct. In June, 1953, she had her first hæmatemesis, and between December, 1953, and March, 1954, she bled at short intervals. A period of a few days without bleeding was thought to be possibly the last chance for operation, which was attempted in spite of the fact that she bled again just before the anæsthesia was induced. Very dense vascular adhesions, the result of her previous operations, led to the abandonment of the operation, and she died after further hæmatemesis next day. At her age, and because the bleeding recurred just before operation, a change of plan and a direct operation on the œsophagus would have been a wiser course.

Before the use of routine transsplenic venography to localise the venous obstruction 4 patients were explored with a view to a portacaval anastomosis, but the operation was impossible because they were found to have complete thrombosis of the portal vein—in 3 secondary to cirrhosis of the liver, and in the 4th due to a primary extrahepatic obstruction. In 1 patient, owing to mural thrombi in its lumen, the portal vein was so adherent that it could not be approximated to the inferior vena cava; so a side-to-side anastomosis was made with an autogenous vein-graft to bridge the gap.

Without a venogram it is sometimes impossible to distinguish whether the obstruction is intrahepatic or extrahepatic. A few patients seemed eminently suitable for a portacaval anastomosis until this radiological investigation showed that they had extrahepatic obstruction and the portal vein was unsuitable for anastomosis (fig. 2). On these patients an alternative operation had to be done.

A portacaval anastomosis was not advised if there was evidence of severe liver disease, indicated by jaundice, gross ascites, or abnormal liver-function tests. Moderate ascites, however, is not a contra-indication. The liver-function test to which most weight was attached is the serum-albumin level, and no end-to-side portacaval anastomosis in this series was done on a patient whose serum-albumin level was below 3 g. per 100 ml. at the time of operation. Most patients had normal serum-alkaline-phosphatase levels, but in 10 the level was above 20 King-Armstrong units, and in 3 it was exceptionally high, though there was no evidence of obstructive jaundice: 1 patient, with a level of 43 units, had schistosomiasis of the liver; another, with 51 units, developed postoperative jaundice, which persisted for three months, but still no cause of obstruction was evident; and the 3rd, whose phosphatase level was 62 units, had a stone in the common bile-duct, though she had never had jaundice. A high serum-alkaline-phosphatase level is therefore no contra-indication to the operation.

Flocculation tests were abnormal in about half the cases; this finding is no contra-indication to the operation, but the liver deficiency which they indicate may predispose to neurological complications afterwards. Bromsulphalein-excretion tests were done on only a few of the patients in the group.

Patients

The present series comprises 56 patients who had end-to-side portacaval anastomoses, and 53 of them survived the operation and left hospital. The cause of the fibrosis in the liver is only definitely known in a minority: 2 patients had hæmochromatosis; 1 had Wilson's disease; and 1 had schistosomiasis. A few gave a history of attacks of acute or subacute hepatitis, but only 2 gave a definite story of alcoholism (1 drank 5 pints of cider and 4 pints of beer daily for twenty years, and the other 7 or 8 bottles of stout daily from the age of 16 to 45). Many were seen within a few months of their first hæmatemesis, but others had had repeated hæmorrhages for periods up to eleven years. 3 gave no history of bleeding but complained of either lassitude (2 cases) or diarrhœa (1 case) and were found to have splenomegaly and large varices.

2 patients had already had their spleens removed, but the bleeding had recurred with renewed virulence. Another had had a splenorenal anastomosis, which had become occluded. The ages at the time of the first bleeding ranged from 5 to 53 years and at operation from 7 to 57 years.

Operation

In every case the exposure was by a right thoraco-abdominal approach through the bed of a rib, usually the ninth, the incision extending across the costal margin. The diaphragm was split to allow upward displacement of the liver, the portal vein was divided as high as possible, and its lower end was anastomosed by continu-

ous everting mattress sutures to the side of the inferior vena cava. At 48 operations, before the anastomosis was made, the portal pressure was measured either in the portal vein itself or in one of its tributaries, and ranged from 160 mm. H_2O to 570 mm. H_2O (average 330 mm. H_2O). In 8 cases some thrombosis was found in the portal vein, usually an old adherent mural clot, but in 4 cases portions of clot were removed to enlarge the lumen. The presence of thrombosis in the portal circulation adds to the severity of the disease, because 2 of these 8 patients died. Splenectomy seems to add to the risk of thrombosis, because both patients who had had their spleens removed previously had mural thrombi, and these 2 are the only survivors who have had any serious bleeding since the operation.

In many cases, when the anastomosis is completed the turbulence set up by the inflow of portal blood can be seen through the thin wall of the inferior vena cava. Anticoagulants were not used as a routine postoperatively. Postoperative venography was done on 6 patients only, but all these showed a free flow into the inferior vena cava (fig. 3).

Results

All the patients were followed up either by attendance or by correspondence for periods ranging up to five and three-quarter years after their operation. 3 patients died while still in hospital:

(1) A woman, aged 38, had a severe hæmatemesis five months before her operation; previously she had had a subarachnoid hæmorrhage and petechiæ on her legs. Her albumin/globulin ratio was 1:1·3 and bromsulphalein retention 22% after one hour. On the day after operation she became drowsy and comatose; a tracheotomy was done to ease her breathing, and her state of consciousness varied, but she died on the thirtieth postoperative day. At necropsy the anastomosis was patent.

(2) A boy had bronchiectasis following an empyema at the age of 14. Hæmatemesis first occurred in 1944 at the age of 23, and during the next eight years he received more than 50 pints of blood, transfusions being necessary on six occasions during the year before his operation. His portal vein contained adherent clot, which was removed with difficulty. Two days after the operation he became unconscious but recovered fully, only to lapse into unconsciousness again on the twelfth postoperative day, after resuture of his wound, which had partly given way during a bout of coughing. He died two days later, and a necropsy was not permitted.

(3) A man, aged 45, had had numerous hæmatemeses during the previous two and a half years. Two laparotomies had been done; at the first some veins had been ligatured, and at the second an attempt had been made to ligature the hepatic artery. Though a lumen was present, his portal vein contained much organised thrombus, and, when the clamp was released, there was only a slow stream of blood. When the liver was incised for biopsy, arterial blood spurted out, showing that the hepatic artery was patent. This patient became drowsy on the fifth postoperative day and died two days later. Necropsy showed extensive thrombosis in the portal system, the anastomosis being almost occluded and the splenic vein entirely blocked. Fresh bleeding had taken place from a ruptured œsophageal varix. It is clear that this patient was unsuitable for the operation, because the occluded splenic vein would prevent decompression of this part of the portal circulation; in the venograms a large collateral had been mistaken for the splenic vein.

5 patients who left hospital have died since. 1 of these died of general peritonitis due to a ruptured pyosalpinx four months after her operation; at necropsy the anastomosis was patent. The other 4 died as a result of their liver disease:

(1) A man had a side-to-side splenorenal anastomosis without removal of the spleen in 1949; after further bleeding a direct operation on his varices was done in 1951; in spite of this he bled again, and his portacaval anastomosis was done in 1951. He died after further hæmorrhage eight months later. At necropsy the splenorenal anastomosis was closed, but the portacaval opening was patent, without any thrombus. The explanation of his death may be that, the splenic vein being thrombosed, the anastomosis did not relieve the hypertension in the spleen.

(2) A woman had three severe hæmorrhages in March, 1954, for which she was transfused with 12 pints of blood. Her other complaints were pain in the right upper quadrant of her abdomen, breathlessness, and a little swelling of her legs. Her liver was hard, and radiography showed much calcification in its capsule. She also had severe leucopenia (600 white cells per c.mm.) and thrombocytopenia. A portacaval anastomosis was made in May, 1954. She was well for some months, but increasing hæmolytic anæmia called for further blood-transfusions and, because this was thought to be due to hypersplenism, her spleen was removed in August, 1955. Shortly before this operation she had an episode of hepatic coma lasting three days. After the splenectomy the anæmia improved, but she had further episodes of drowsiness, and died in coma in February, 1956. Histological evidence showed that she had hæmochromatosis.

(3) and (4). 2 patients died of liver-failure thirty-three and twenty-eight months after operation without any recurrence of hæmorrhage.

Apart from the cases referred to already, only 2 patients had any recurrence of hæmorrhage:

(1) A man was diagnosed as having anæmia while in the Royal Air Force in 1943. Two years later, after numerous attacks of melæna, his spleen was removed. Eight months after this he had the first of a series of hæmatemeses, and a portacaval anastomosis was made in 1951; at that time his portal venous pressure was 300 mm. H_2O. Slight melæna occurred in 1952, and a year later he had a severe hæmorrhage. A direct operation on his varices was undertaken, and in the three years since then he has had two slight hæmorrhages; otherwise he remains well.

(2) A man had his first hæmorrhage in 1942 at the age of 19. In 1944 his spleen was removed, but repeated hæmorrhages continued, and he required many blood-transfusions. In January, 1953, the portacaval anastomosis was made, and at that time a thrombus was adherent to the anterior wall of the portal vein. His portal venous pressure was only 160 mm. H_2O. Only eight weeks after this operation bleeding recurred and, after a severe attack in the following September, a direct operation on his varices was done. Since then bleeding has not recurred, œsophagoscopy shows hardly any varices, and he works as a radio engineer.

The reason for the recurrence of bleeding in these 2 patients is not clear, but the only 3 patients in this series who have had any significant bleeding after leaving hospital had all had either a splenectomy or a failed splenorenal anastomosis. No other patient in the series had had the spleen removed, and no patient who had a portal venous system which had not previously been interfered with has had any serious bleeding since the operation.

Complications of Operation

Complications of the operation were, with one exception, rare: slight wound infection in a few cases, a pneumothorax once, and transient jaundice. The serious complication is the neuropathy associated with portal systemic shunts, whether natural or produced by the surgeon (Sherlock et al. 1954). It has already been noted that coma was the cause of death in the 3 patients who died in hospital. 9 other patients had episodes of encephalopathy. In 1 the only manifestation was excessive salivation, which persisted for two years after his operation but has now subsided. 4 had episodes of coma; 1 has already been described (see above); in another the attacks persisted for four months after her operation; and 1 patient had a single attack, five weeks after operation, from which she made a rapid recovery. In the 4th of these patients the coma followed partial gastrectomy for peptic ulcer nearly two years after his venous shunt. 1 patient was so queer on returning home that her doctor sent her into a mental hospital; but, when the nature of her condition was recognised and appropriately treated, she made a complete recovery.

3 more had transient mental disorientation, usually soon after returning home, and the patient who died of a ruptured pyosalpinx was definitely slow mentally for the first six postoperative weeks. One patient has had periods of depression and mental distress during the three years since her operation, but biochemical tests suggest that she does not fall into this group of hepatic neuropathies.

It seems that the danger of these complications is greatest soon after patients return home, and the episode may be precipitated by eating a large protein meal. Usually there is a quick response when the patient is put on a protein-free diet, and in most cases a steady return to normal diet can be permitted. Patients with defective liver function are much more liable to these complications, but 5 of the 13 who developed neurological symptoms had normal liver-function tests.

Two symptoms were noted during the follow-up: (1) occasional epistaxis and œdema of the legs occurred in 2 patients and may be the result of the operation or may be caused by the disease of the liver; and (2) 1 patient has ulcerative colitis four years after her operation —an example of the well-recognised association between these two diseases.

In the great majority of patients there has been no evidence of deterioration of the function of the liver during the years that they have been followed up; the cirrhosis appears to be static. Liver-function tests were made on practically all of them and usually showed little change from the preoperative values. Some of the patients had leucopenia and thrombocytopenia before the operation, and this tended to improve slowly; in only 1 case (see above) was it considered necessary to remove the spleen because of continued hæmolysis, thought to be due to hypersplenism. The reduction in size of the spleen is most striking: within the first day the apex recedes, but after this further reduction is slow and may continue for years, until often it eventually ceases to be palpable. Only a few patients had recognisable ascites before operation, and in no case was it necessary to do paracentesis afterwards.

Most of the patients are leading normal lives; in the few who are incapacitated, so that they cannot work, the cause is to be found in the associated disease of the liver.

Conclusions

As a means of preventing hæmorrhage from œsophageal varices in patients in whom the operation is feasible an end-to-side portacaval anastomosis is most effective. By careful selection of patients the operative risk is small (3 deaths in 56 cases), and the results are most satisfactory unless some disease is causing progressive deterioration of the function of the liver. The most serious drawback of the operation is the neuropathy which may result from a large portal-systemic shunt. Symptoms, usually transient, develop in about 20% of cases but are rare in those whose liver function is normal.

In a follow-up extending to five and three-quarter years 2 patients who had previously undergone splenectomy both had a recurrence of hæmorrhage, but after an operation on their varices they returned to their occupations. There was no recurrence of hæmorrhage from varices in the 50 survivors who had not had a previous operation involving the portal venous system, but 4 died subsequently: 1 of hæmochromatosis, 2 of their cirrhosis, and 1 of unrelated disease. Of the 46 remaining 35 have no symptoms and are leading perfectly normal lives and 7 have been operated on too recently to be back at their occupations.

This series of cases shows that an efficient end-to-side portacaval anastomosis will greatly reduce the risk of further hæmorrhage in cases of portal hypertension due to intrahepatic disease.

My thanks are due to so many people who have coöperated in the management of these patients that I cannot mention them all; so I refer only to the sisters, nurses, and house-surgeons who have given them such great care, and the doctors —specialists and general practitioners—who have entrusted me with the care of their patients and assisted in following them up. Part of the cost of the recording manometer used was defrayed by a grant from the Medical Research Council.

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"PNEUMOCYSTIS CARINII" PNEUMONIA

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With illustrations on plate

FROM the atypical pneumonias of infancy, European observers have separated a specific clinical and pathological entity which they called interstitial plasma-cell pneumonia. This disease, as seen on the Continent, affects chiefly premature and immature weakly infants, aged 2–5 months, many of whom have been in institutions for some time. Although it is sometimes preceded by diarrhœa or an acute infection of the upper respiratory tract, its onset is generally insidious, mild ill health being followed by respiratory upset with tachypnœa, dyspnœa, and cyanosis; these increase gradually or rapidly, and death, if it happens, occurs with extreme asphyxia. Cough is trivial. The objective findings are curiously slight; thus there is little or no fever, and clinical examination of the chest may reveal nothing abnormal. In striking contrast with this is the radiological picture, which shows obvious mottled opacity, sometimes even before respiratory symptoms have appeared. The illness lasts 1–6 weeks, occasionally longer. The variation of the reports on mortality, from 15% to 100%, no doubt reflects the difficulty of clinical diagnosis. Histopathological diagnosis has in recent years become more certain, the two main features being an intra-alveolar "exudate" of unusual foamy or granular appearance and thickening of alveolar septa by an infiltrate of mononuclear cells, often rich in plasma-cells. The ætiology is still very much a matter of debate, and the term "pneumocystis" pneumonia has come into use on the basis of one of the ætiological hypotheses (see below).

Most of the published cases have been in Switzerland, Czechoslovakia, Germany, and Finland, where pneumocystis pneumonia is considered a relatively common disease; in these countries small epidemics have also occurred, of five to twenty cases, usually in hospital wards. The disease next appeared, or was recognised, in Italy, Hungary, Sweden, Denmark, France, and Holland, but thus far usually as sporadic cases. Its first mention in America was in 1955 (Lunseth et al. 1955), and a detailed study of a case followed in 1956 (Dauzier et al. 1956). Five cases have now been described in Canada (Donohue 1956, Gagne and Hould 1956). The first case to be published in England was seen by Baar (1955), who later in that year recognised from the photomicrographs (Hutchison 1955b) that a case of congenital agammaglobulinæmia in Glasgow reported by Hutchison (1955a) had the characteristic pulmonary changes.

During the past year two children have died in Dundee with a clinical and pathological picture which we believe conforms with this curious disease, although both children were older than is usual in the Continental cases.

The Illness

FIRST CASE

A male infant, aged 9 months, was admitted to Dundee Royal Infirmary on July 23, 1955, because of recurrent vomiting, failure to gain weight, a cough for 3 months, and a discharge from the right ear for 1 month.

He had been born by spontaneous breech delivery at term, weighing 6¾ lb. Fed on National dried milk, he had always had a poor appetite and gained weight slowly, and latterly he had seemed to be wasting. Vomiting started at the age of 7 weeks and came on thereafter for periods of about 2 weeks, with free intervals of the same duration; it was sometimes forceful and happened during or after feeding. When 3 months old he had a frank convulsion, and in the succeeding 3 months he had attacks in which his limbs stiffened and his eyes rolled up. At 6 months he developed a cough, which persisted without remission until he was admitted to hospital. Both parents, who are not related, and four older children, are all in normally good health, with normal chest radiographs.

On admission he was poorly nourished, looked toxic, and weighed 14 lb. 3 oz. He was apyrexial but moderately dyspnœic, with respirations 40–50 per min. Muscle tone was poor. The gums were red and inflamed, and he had a few shallow white ulcers on his palate. The alæ nasi moved with respiration, and there was slight intercostal indrawing. Percussion note and air entry were normal throughout the chest, but occasional crepitations were heard at both bases. Chest radiography showed diffuse fluffy mottling throughout both lung fields (fig. 1).

Course in Hospital

A diagnosis of bronchopneumonia was made and treatment with penicillin and sulphamezathine was begun.

There was little improvement during the next week, cough being persistent, vomiting still fairly frequent, and the X-ray picture unchanged. Streptomycin was substituted, and there was some improvement for the next 12 days, but radiography showed increased mottling (fig. 2). On Aug. 12 the baby's condition changed rapidly, with dyspnœa, tachypnœa, and cyanosis. His pulse and respiration rates rose, and he died on Aug. 18.

Laboratory Investigations

The white-cell count on admission was 31,000 per c.mm., with a preponderance of neutrophils; hæmoglobin 12 g. per 100 ml.; and erythrocyte-sedimentation rate (E.S.R.) 10 mm. in 1 hour (Wintrobe). Nothing abnormal was found in the urine, and lumbar puncture revealed normal cerebrospinal fluid. The Mantoux reaction was negative (1 : 2000), and no tubercle bacilli were found in gastric washings. Stool examinations for tryptic activity were positive, and repeated culture of the stools did not produce any pathogens.

The white-cell count settled around 12,000 per c.mm. (differential count normal), and the E.S.R. remained at 10 mm. in 1 hour. *Staphylococcus aureus* was grown on one occasion from throat swabs, but fungi were not isolated.

The most striking findings in this infant were the negative physical signs in the chest, in contrast to the increasing dyspnœa and cyanosis, and the gross radiological changes throughout the illness.

SECOND CASE

A male infant, aged 11 months, was admitted to Arbroath Infirmary on Jan. 18, 1956, because of cough which had persisted for 3 months.

He was born at term and weighed 9 lb. 7 oz. Everything seemed normal then, and he was breast-fed for 9 months. His only illness was infantile eczema; because of this he was not vaccinated or otherwise immunised. Both parents are healthy and have normal chest X-rays. There had been two other children, both male. The first died in 1952, aged 4 months, with *Shigella sonnei* dysentery, and the second died in 1954, aged 5 months, with gastro-enteritis associated with *Escherichia coli neopolitanum 055* and pneumonia. No necropsies were performed.

When 8 months old he developed a running nose, and the discharge soon became yellow and purulent. Cough appeared and persisted. 6 weeks before admission he had an attack of wheezing, shortness of breath, and pyrexia. This was treated with penicillin and chloramphenicol orally with considerable improvement, but the cough persisted. 3 days before admission he developed thrush in his mouth and became restless and feverish, with rapid breathing.

On admission he was an ill child, irritable and poorly nourished. There was slight dehydration and hypotonia. He had fever (103°F) with respirations 50 per min., but there was no dyspnœa or cyanosis. The percussion note was impaired over the right chest anteriorly, and pneumonia of the right middle lobe was demonstrated radiologically (Dr. T. Sprunt).

Course in Hospital

Penicillin and sulphadimidine were given. His temperature fell to normal within 48 hours, and there was rapid resolution of physical and radiological signs in the chest. His general condition improved, but his cough persisted, and after 7 days radiography showed diffuse fluffy mottling throughout both lung fields, most marked towards the hilum, with relatively clear peripheral fields. During the next 2 weeks these changes increased despite the absence of physical signs (fig. 3); and pneumocystis pneumonia was tentatively diagnosed.

He was transferred on Feb. 11 to Dundee Royal Infirmary, where treatment was continued with courses of penicillin, sulphamezathine, streptomycin, erythromycin, and tetracycline, with no obvious benefit. His clinical condition remained unchanged, without causing undue anxiety, but radiography showed progressive pulmonary changes (fig. 4). Hypogammaglobulinæmia was first sought and found on Feb. 21. 2 days later his condition changed rapidly, and he became dyspnœic, with respirations up to 90 per min. and a pale greyish cyanosis, relieved only by oxygen.

Gamma-globulin was given intramuscularly in doses of 1 g. to a total of 6 g. during the next 12 days with no apparent effect.

Because of the pattern of the illness, with tachypnœa, dyspnœa, cyanosis, and negative physical signs, but gross radiological changes and failure of response to antibiotics, we felt more confident of the diagnosis of pneumocystis pneumonia. He was given pamaquin 2 mg. five times daily for 6 days, followed by mepacrine 25 mg. twice daily for 6 days, and for 2 days by 'Infant Acetylarsen' 1 ml. daily (Dvořak and Jirovec 1953). Chloramphenicol was substituted for other antibiotics (Eberle et al. 1955).

From the time of this dramatic change in his condition he steadily deteriorated and was cyanosed whenever out of oxygen. On Feb. 26 he developed transient clubbing of the fingers and toes for 4–5 days.

The temperature, white-cell count, and E.S.R. remained normal. The picture was now one of steadily increasing asphyxia (fig. 5). The infant became gradually thinner, more fretful, and apprehensive, and on March 18 he developed subcutaneous emphysema over his neck and upper chest, with bilateral pneumothorax. He died next day.

Laboratory Investigations

On admission to Dundee Royal Infirmary his white-cell count was 10,000 per c.mm. (differential count normal), hæmoglobin 14·8 g. per 100 ml., and E.S.R. 4 mm. in 1 hour (Wintrobe). His urine was normal on several occasions, and proteinuria was never found.

Extensive investigation of his blood chemistry showed no abnormality. In view of the association reported between interstitial plasma-cell pneumonia and hypercalcæmia (Hallman et al. 1954) it may be noted that the plasma-calcium level

LEGENDS TO ILLUSTRATIONS ON PLATE

DR. BIRD, DR. THOMSON

Fig. 1—Case 1 (July 23, 1955): bilateral opacities radiating from hila, and diffuse finer nodular opacities.

Fig. 2—Case 1 (Aug. 8, 1955, ten days before death): increase of opacities and interstitial change, especially in left upper zone.

Fig. 3—Case 2 (Feb. 10, 1956): bilateral poorly defined shadows radiating from hila.

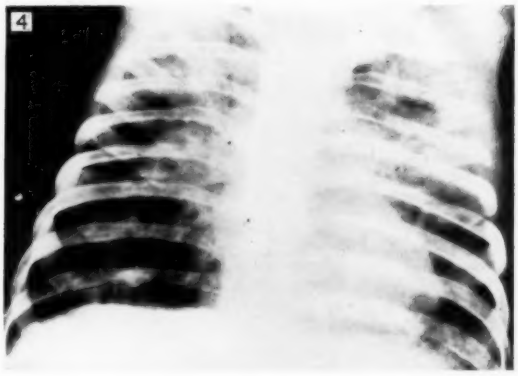
Fig. 4—Case 2 (Feb. 28, 1956): increase of opacities, especially in upper zones, tending to become confluent.

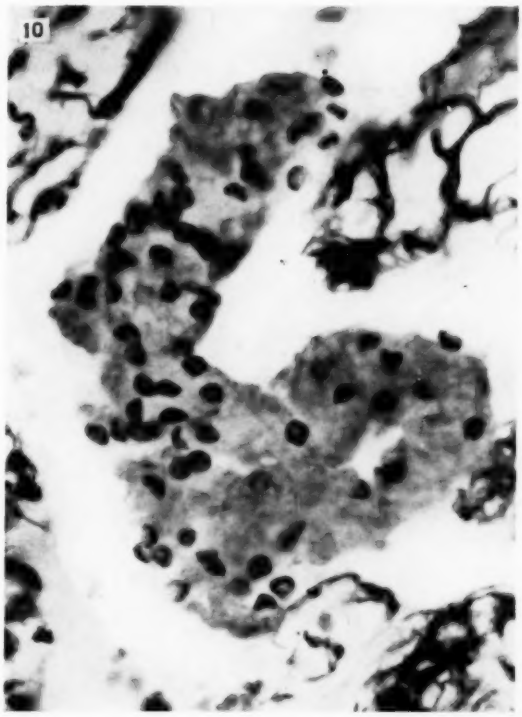
Fig. 5—Case 2 (March 6, 1956, twelve days before death): opacities now more confluent, and there is diffuse consolidation.

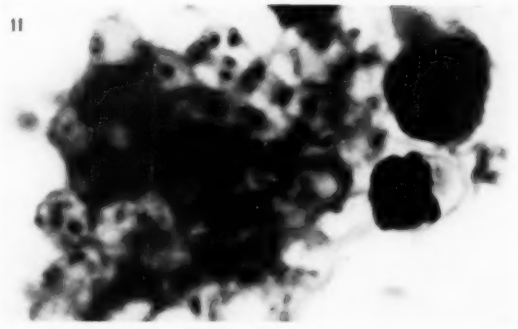
Fig. 10—Case 2: silver impregnation (Le Tan Vinh 1954) showing intra-alveolar mass containing cysts. Note septal reticulin well stained but erythrocytes and cell nuclei not stained by this method. (× 636.)

Fig. 11—Case 2: imprint from lung showing cysts containing spherical bodies. (Giemsa. × 1858.)

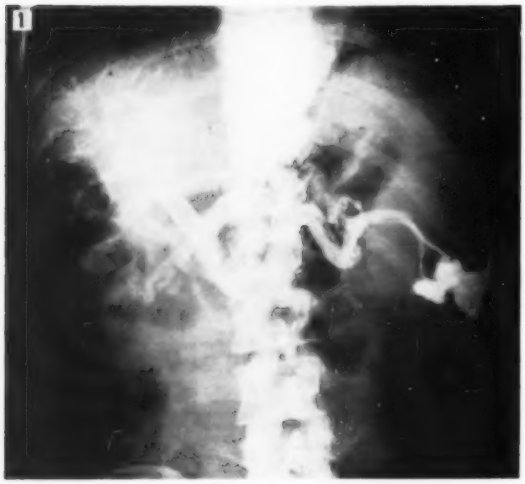
DR. BIRD AND DR. THOMSON: "PNEUMOCYSTIS CARINII" PNEUMONIA

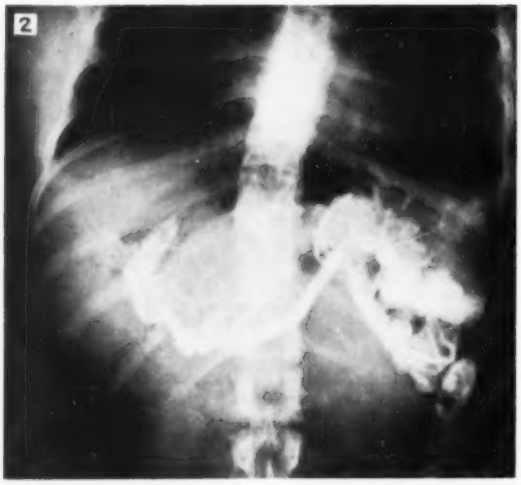


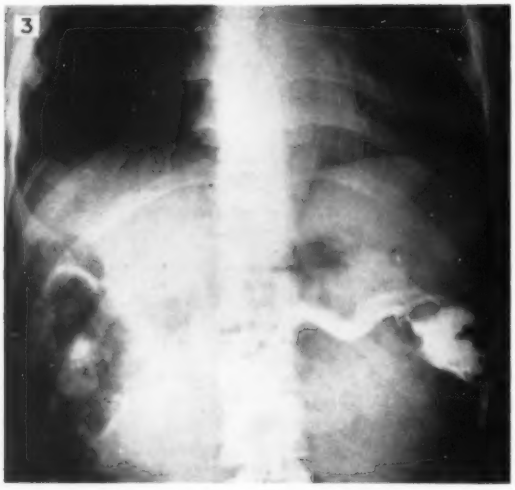




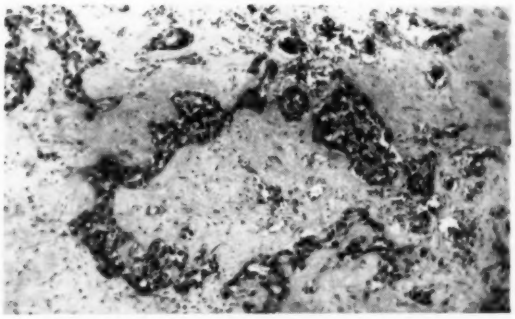
PROF. MILNES WALKER: PORTACAVAL ANASTOMOSIS

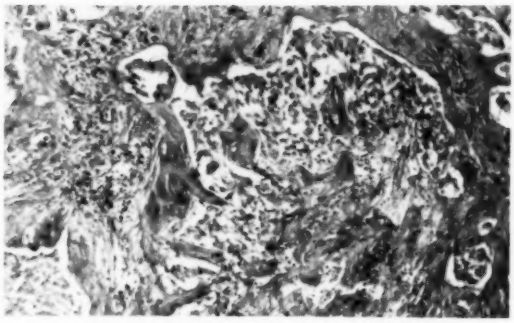




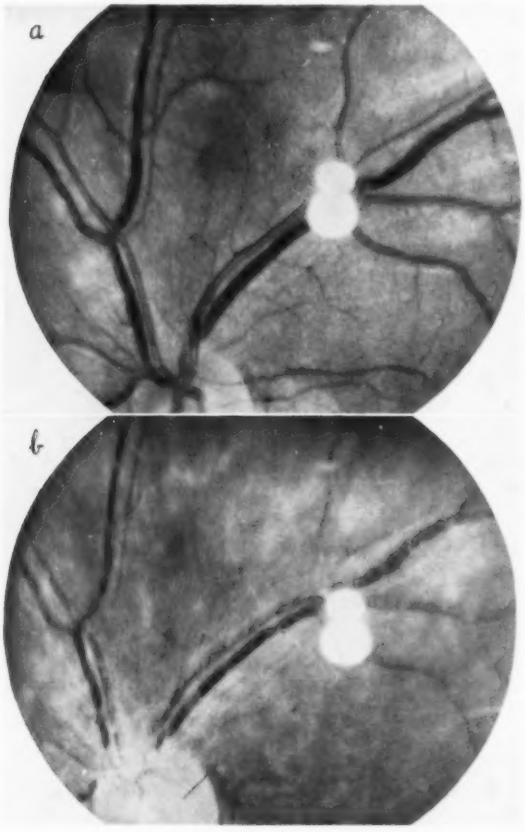


PROF. GILLMAN AND OTHERS: ALLOXAN





DR. SNOW: SLUDGING OF BLOOD



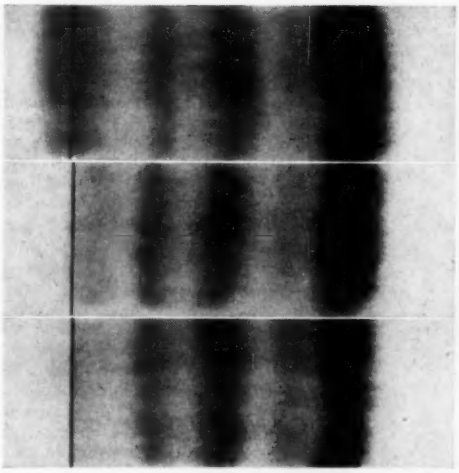


Fig. 6—Top register: "normal" infant aged 12 months; middle register: case 2 showing absence of gamma-globulin (Feb. 21, 1956); bottom register: case 2, after intramuscular gamma-globulin 6 g. showing no obvious change (March 6, 1956).

was only 9·8 mg. per 100 ml. and the plasma-phosphorus level 4·2 mg. per 100 ml. on two occasions.

Pancreatic trypsin was demonstrated in the fæces on several occasions. The white-cell count varied from 7000 to 10,000 per c.mm., and differential counts showed a slight increase of polymorphonuclear cells. The hæmoglobin was always more than 14 g. per 100 ml.

Staph. aureus, resistant to all antibiotics tried, was twice isolated from the nose. During the last week *Esch. coli neapolitanum 0119* was isolated from the stools, but there was no diarrhœa.

Serum-proteins were low from the time of admission. The total was never more than 4·9 g. per 100 ml., the albumin varying from 3·2 to 3·4 g. and the globulin from 1·5 to 1·7 g. Paper electrophoresis (fig. 6) on Feb. 21 showed an absence of gamma-globulin, confirmed on following days, and chemical fractionation (Wolfson et al. 1948) revealed levels of about 75 mg. per 100 ml. (Miss R. Haslock). There was a slight increase of alpha-1 and alpha-2 globulin. The normal level of gamma-globulin at the age of 12 months is 450–700 mg. per 100 ml. (Moore et al. 1949, Corbiel et al. 1954) and rises to the adult level of 1000–1200 mg. in later childhood.

No changes were noted during the remainder of the illness after the administration of gamma-globulin in large doses, apart from an increase in alpha-1 globulin.

Electrophoresis and chemical fractionation of both parents' serum gave normal findings.

The blood-group was O Rh-positive, and no iso-agglutinins anti-A or anti-B could be demonstrated at 4°C, room-temperature, and 37°C by the methods recommended by Dunaford (1953) (Dr. F. S. Graham).

Comment on Radiographs (Dr. C. Pickard)

A widely disseminated granular lesion of the lung fields, but detailed examination shows the opacities to have a fluffy irregular outline, unlike the discrete characteristics of miliary lesions. There is no evidence of hilar glandular enlargement. The pattern progresses to more widespread and confluent fluffy opacities. The general impression is of a disseminated alveolar lesion becoming lobular and ultimately widespread.

LEGENDS TO ILLUSTRATIONS ON PLATE

PROF. MILNES WALKER

Fig. 1—Venogram showing intrahepatic obstruction in man, aged 24, who had had two severe hæmorrhages. Note filling of œsophageal varices and a healthy portal vein.

Fig. 2—Venogram showing extrahepatic obstruction in woman, aged 23, who had a severe hæmatemesis with no previous symptoms. Extensive varices were present; but, before venography, there was no indication that the obstruction was extrahepatic.

Fig. 3—Venogram after portacaval anastomosis in same patient as in fig. 1.

PROF. GILLMAN AND OTHERS

Fig. 2—Case 2: sclerotic primary tumour representative of the liver at necropsy (×72).

Fig. 3—Case 2: characteristically sclerotic metastasis in abdominal lymph-nodes (×72).

DR. SNOW

Retinal vessels: *a*, uncompressed; *b*, during compression.

To slow the stream sufficiently for photography, relatively firm pressure was applied to the eye by the patient himself: hence the appearance of sludging in the arteries as well as the veins. When the photograph was taken, the E.S.R. was 50 mm. in one hour, and the serum-globulin level 5 g. per 100 ml. A diagnosis of Hodgkin's disease was established three months later.

Post-mortem Findings

FIRST CASE (Dr. H. G. Morgan)

Examination 16 hours after death. A slightly dehydrated infant, the only significant gross findings being in the lungs. There was no pleural reaction or fluid, and both lungs showed an identical appearance, being finely nodular throughout all lobes, with no predilection for any site. The pattern suggested bronchopneumonia, but even the smallest of the visible bronchi appeared unaffected. Most of the nodular areas were 1–3 mm. in diameter, whitish, and firm, and the intervening lung was firmer and drier than normal, with small areas of emphysema. The larger bronchi contained a little mucus but no pus or aspirated material. The paratracheal and bronchopulmonary lymph-nodes were not enlarged.

Culture of lung tissue produced a growth of pneumococci and *Candida albicans*.

Other organs showed no abnormality, and there was no lymphadenopathy or splenomegaly. The middle ears contained no pus.

Microscopy

In the nodular areas described in the lungs there is a diffuse interstitial infiltration of mononuclear cells, including plasma-cells, with only occasional polymorphs. The alveoli and alveolar ducts are filled with a weakly eosinophilic exudate of granular, foamy, or honeycomb appearance. The spongework is brilliantly fuchsinophil with the periodic acid-Schiff reaction, but is completely negative for fibrin, mucin, and glycogen (fig. 7). With the Schiff method, Giemsa's stain, or toluidine-blue, many of the clear spaces, particularly at the periphery of the honeycomb, are seen to contain one or more free-lying tiny granular bodies. In most places the intra-alveolar exudate is quite acellular, but there is frequently a prominent alveolar lining with cuboidal cells. Desquamated cells occasionally seen in the exudate sometimes contain finely granular fat or Schiff-positive granules. In other places the exudate appears to have undergone necrosis, and the peripheral cells then are of foreign-body giant-cell type. In these small granulomatous foci the necrotic exudate has taken up calcium, but this is rare and not likely to be the explanation of the severe and widespread radiological change. Between the nodular areas of consolidation the lung shows a moderate diffuse infiltration of the alveolar septa by a mononuclear-cell infiltrate, associated often with areas of emphysema. There is no evidence of cytomegalic or other inclusion bodies.

Sections made from other viscera, including lymph-nodes, spleen, and bone-marrow, are all normal, and there is no evidence of inclusion disease in pancreas, kidney, or salivary glands. The lymph-nodes from numerous sites are small, containing only a few primary, and no secondary, follicles. Smears and sections from the nodes, spleen, and bone-marrow show only a very occasional plasma-cell. In the kidneys an occasional tiny focus of calcium deposition is seen in collecting tubules, sometimes associated with a slight granulomatous reaction.

SECOND CASE

Examination 2 hours after death showed a thin wasted cyanotic infant, with subcutaneous emphysema over the chest

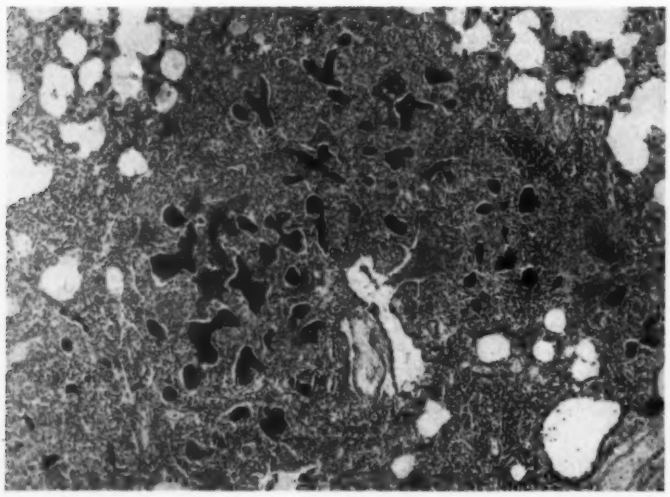


Fig. 7—Case 1: lung showing "exudate" as dark masses in alveoli and as grey granular material in bronchiole. Note thickening of alveolar septa by cellular infiltrate. (Periodic acid-Schiff. × 68.)

posteriorly and reaching up to the root of the neck. Gross changes were confined to the thorax. There was bilateral pneumothorax, but the lungs were bulky and retained their shape. The pleural surfaces were normal apart from occasional small subpleural hæmorrhages and interstitial emphysema, and there were collections of air at the hila, extending behind the parietal pleura to reach the neck.

The lungs were pinkish-white and diffusely firm, with a rubbery consistence, and all the lobes were equally affected. Only the margins obviously contained air, and here occasional subpleural spaces up to 0·5 cm. in diameter were seen. Throughout both lungs the lobular pattern was accentuated, and, with the colour and consistence, resembled pancreas or thymus—suggesting the term "pancreatisation." The bronchi contained a little viscid mucus; their cut surface was rather dry, and only a little serous fluid was obtained on scraping.

The paratracheal and bronchopulmonary lymph-nodes were small. There was a mild thrush œsophagitis, and the only other striking feature was the striking deficiency of lymphoid tissue throughout the body, though the spleen was of normal weight. No abnormality was seen in other organs.

Microscopy

The changes in the lungs are essentially the same as in case 1, but more widespread and uniform. There are no areas of necrosis and granulomatous change, and no plasma-cells are seen in the interstitial infiltrate (figs. 8 and 9). The lungs therefore resemble more closely the Continental descriptions except for the absence of plasma-cells.

There is no evidence of inclusion disease of parasites in the other viscera. The lymph-nodes, spleen, and bone-marrow are similar to those in case 1, but no plasma-cells can be seen.

Sections and material were sent to Professor Hamperl (Bonn), Professor Vanek (Prague), Dr. Le Tan Vinh (Paris), and Dr. E. K. Ahvenainen (Helsinki): all agreed that this was the disease they had described and were willing to accept the absence of plasma-cells as in some way associated with hypogammaglobulinæmia. Using the modified del Rio Hortega method of Le Tan Vinh (1954) we have succeeded in showing in sections the cysts described by him and shown by Hamperl (1956b) by phase-contrast miscroscopy in smears (fig. 10). Dr. Le Tan Vinh was kind enough to stain and study our material and said that he regarded the cysts as pathognomonic.

We hope to describe the microscopy of this disease more fully elsewhere, but meanwhile it may be said that the interstitial changes are moderate, plasma-cells are not the predominent type in either case, and the pathognomonic feature in both cases is the intra-alveolar spongework (see below). It is generally agreed that the responsible organisms are best seen in lung imprints. In our hands Giemsa's stain gave the best results, and fig. 11 shows the appearance in smears made at necropsy. The honeycomb structure apparent in the sections is again seen, but in addition there are more obvious cyst-like structures, 5–9 μ in diameter, containing small round bodies which are uniformly basophilic. Routine cultures and injection of lung extracts into guinea-pigs and rabbits did not produce pyogenic bacteria or fungi.

Discussion

Clinical Definition

The clinical definition of this disease is likely to become sharper with the advent of the new histopathological criteria. The question, however, will probably remain whether all the many cases described in the past as interstitial plasma-cell pneumonia were the very specific anatomical entity which at present goes under the name of pneumocystis pneumonia.

Clinically characteristic of the fatal cases is the fact that the radiological changes, from an early stage in the disease, are of a striking degree and quite out of proportion to the symptoms and signs. There is a complete lack of response to antibiotics, and later an increasing oxygen starvation. Laboratory methods do not yet give any real help in diagnosis, though Vivell (1954) and Navratil et al. (1954) have claimed good results with complement-fixation tests using extracts of lung from proven cases. Braestrup (1956), however, thinks that there is little to be gained clinically by further diagnostic analysis during life. We can liken the situation to that

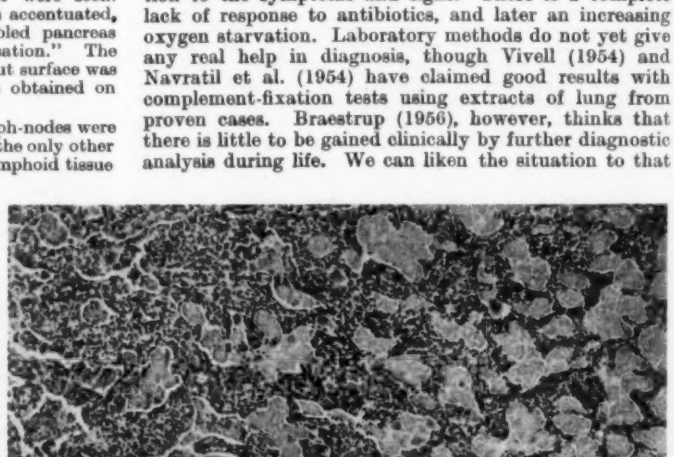


Fig. 8—Case 2: lung showing intra-alveolar "exudate" as poorly stained and generally acellular sponge-work and highly cellular interstitial tissue. This illustration is very like fig. 3 of Hutchison (1955a). (Hæmalum and eosin. × 70.)

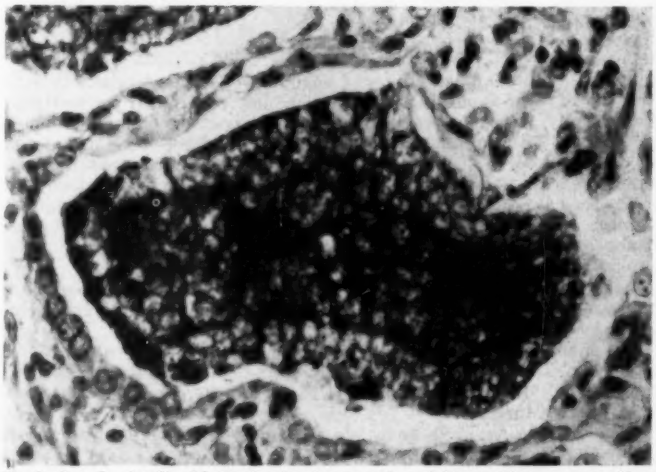


Fig. 9—Case 2: details of intra-alveolar honeycomb and its constituent cysts. Note prominent alveolar lining. (Periodic acid-Schiff. × 479.)

of leprosy thirty years ago, where the morbid anatomy was clear-cut and accurately indicated the diagnosis, an organism was known but could not be satisfactorily incriminated, and treatment was both empirical and ineffective.

Ætiology and Therapy

The only practical knowledge yet available is the reported occurrence of epidemics among infants in hospital, and the Continental workers believe that prophylactic segregation is of value (Reiseterbauer and Braun 1955, Hamperl 1956b). Tobler (1956) claims that the disease has been eliminated in his unit in Switzerland by the use of ultraviolet ray sterilising-lamps in the nursery cubicles for premature infants. Many agents have been tried in treatment of the established disease, but the value of none has been confirmed. The antiprotozoal drugs (pamaquin, mepacrine, emetine, and organic arsenicals) have been commended by Vanek et al. (1953), fungicidal drugs by Petersen (1953), and chloramphenicol by Eberle et al. (1955). Gamma-globulin has also been recommended (Sternberg and Rosenthal 1955), but this, like the other therapies, proved of no value in our hands.

Morbid Anatomy of the Lungs

The original descriptions of interstitial plasma-cell pneumonia were not very sharply drawn and did not separate it from non-specific chronic inflammation. The recognition of the peculiar character of the intra-alveolar exudate (Ammich 1938, Benecke 1938, Vanek and Jirovec 1952) now allows a definite diagnosis to be made post mortem. Having observed two cases in Dundee within a short time, we naturally wondered how many cases had been missed. After all, this is a widespread disease on the Continent: and Switzerland, with its population of 7 million, had 700 cases in 1941–49 (Deamer and Zollinger 1953), while Jirovec (1954) estimates the number of cases in middle Europe at about 500 in 1951–53. A study of 218 infantile cases of pneumonia coming to necropsy in Dundee in 1935–55, and of the comparable cases in Newcastle upon Tyne in 1945–51, did not reveal a single example. Baar's experience in Birmingham (Baar 1955) also suggests that the disease is new to Britain.

Intensive study of the intra-alveolar "exudate" as the probable site of the infective agent has produced a sharp division of opinion. On the one hand, there is strong support (Hamperl 1952, 1956a and b, Herzberg et al. 1952, Le Tan Vinh 1954, Baar 1955) for the view of Jirovec and Vanek (1954, 1956) that the "exudate" is a mass of protozoa (*Pneumocystis carinii*). On the other hand is the view that the infection is fungal. Csillag and Brandstein (1954) favour blastomyces, whereas Simon (1953) believes it to be an unusual form of candida occurring in debilitated people. The most likely is perhaps saccharomyces (Bruns and Böttger 1955), which Schmid (1955) believes to be able to form not only the intra-alveolar masses but also the cyst-like structures which supporters of pneumocystis claim to confirm their view. Saccharomyces has been grown by Schmid (1955) from cases with this curious sponge-work in their alveoli; but the pneumocystis has not been cultured or transmitted or defined in any way other than by visual observation of smears, imprints, or sections.

Pneumocystis carinii

This protozoön was described first by Chagas (1911) and later by Carini and Maciel (1915) in the lungs of guineapigs infected with *Trypanosoma cruzi and T. lewisi*. It was later seen by Delanoe and Delanoe (1912) in the lungs of rats without trypanosomes; these workers recognised that this was a separate organism and named it *Pneumocystis carinii* (Wenyon). The cycle of pneumocystis has been studied extensively by Vanek et al. (1953), who describe it as a round or an oval mass of chromatin, 1–3 μ in diameter, enclosed in a mucous capsule 5–10 μ in diameter. The organism reproduces by division into 2, 4, 6, and finally 8 spore-like structures within a thickened cyst-wall. The hosts now known include rats, mice, dogs, cats, goats, and sheep, and the distribution is world-wide.

Pneumocystis carinii has been found in the lungs of adult humans with pneumonia associated with Hodgkin's disease (Vanek 1952), myeloid leukæmia (Jirovec and Vanek 1954), and cytomegalic inclusion disease (Hamperl 1956a). In a fourth adult it was found without pneumonia (Van der Meer and Brug 1952). It has also been found in older children aged 5 years by Dr. Pavlica (Prof. J. Vanek, personal communication) and 2 years (Le Tan Vinh 1954) dying with pneumonia in association with neoplastic disease of the reticulo-endothelial system.

Most of the Continental workers (Le Tan Vinh 1954, Hamperl 1956a, Jirovec and Vanek 1956) favour the pneumocystis as the causal agent of this peculiar pneumonia of infants.

The evidence incriminating *Pneumocystis carinii* is not, in our view, complete enough to absolve other organisms—e.g., a fungus such as saccharomyces. Our reason for using the name "pneumocystis" in the title of this paper is our inability to coin a more neutral adjective which would be familiar to those who have already studied the disease, would indicate this very specific anatomical change, and would be as easily pronounced.

Associated and Predisposing Abnormalities

The disease is almost confined to infancy, and most of the infants affected have been premature, immature, or otherwise weakly. There seems to be no special seasonal prevalence. The rarity of cases after the first 6 months of life, and the odd fact that the reported adult cases all had a disease involving the reticulo-endothelial system, naturally suggest that an alteration of plasma-globulins has some predisposing influence.

The plasma-gamma-globulin level is known to be lowest in the normal infant at about the 3rd month; thereafter the waning of the supply received from the mother is

countered by intrinsic formation. It is not known whether the weakly infant has a longer period of diminution of circulating gamma-globulin. Infants with pneumocystis pneumonia do not show a serum-protein pattern different from that in unaffected controls (Vanek 1956); but Vanek (1956) does not mention the subdivisions of the gamma-globulins, and perhaps antibody activity is particularly localised in the subfraction gamma 2 (Martin 1954). The suggestion of a relation between plasma-proteins and pneumocystis pneumonia (Gormsen 1950) was reinforced by Baar's (1955) recognition that the lung illustrated in Hutchison's (1955a) report of a case of congenital agammaglobulinæmia was that of pneumocystis pneumonia. This observation gains significance by the finding in case 2 of an almost complete absence of gamma-globulin from the plasma. In our other case, and in Hutchison's (1955a) first case the plasma-proteins were unfortunately not estimated, but the fact remains that of the four cases of pneumocystis pneumonia observed in Scotland, two had so-called agammaglobulinæmia.

Diminution of gamma-globulin therefore seems likely to be a significant predisposing factor in the development of pneumocystis pneumonia. Indeed it is possible that the four cases in Scotland occurred because the infants had exceptionally little gamma-globulin. In two of the cases there was no estimation to support this view, but all four infants were males, and congenital agammaglobulinæmia (strictly speaking it is hypogammaglobulinæmia) is perhaps confined to males (Good and Zak 1956), and sections from Hutchison's (1955a) patients, aged 6 months and 20 months, which Dr. A. M. MacDonald, pathologist to the Royal Hospital for Sick Children, Glasgow, was kind enough to send us, show the same virtual lack of plasma-cells as do the Dundee cases. In both these respects the Scottish cases are unusual, because on the Continent the sex-incidence is equal in pneumocystis pneumonia, and the cellular infiltrations are composed mainly of plasma-cells; a deficiency of plasma-cells is known to be characteristic of congenital hypogammaglobulinæmia. The absence of hæmagglutinins in the two present cases adds further support to this view (Good and Zak 1956). The case reported by Dauzier et al. (1956) was in a boy aged 21 months, and the history of recurrent pyogenic infections of the respiratory tract suggests that this was a comparable case; unfortunately there is no mention of the serum-proteins.

We do not wish to emphasise unduly the suggestion that all four cases were examples of this congenital inability to form gamma-globulin, but the two proven cases raise another interesting point. Usually hypogammaglobulinæmia in infants is characterised by recurrent bacterial infections, especially of the respiratory system and the skin (Bruton 1952, Good and Zak 1956), and these pyogenic infections have been controlled by intramuscular administration of gamma-globulin. On the other hand, in all four Scottish cases there was, at necropsy, a remarkable absence of any sign of pyogenic infection, and we suggest that the organisms in the alveolar spongeworks, be they protozoa or fungi, may have been producing some substance inhibiting pyogenic bacteria. Admittedly antibiotic therapy had been given, but in Hutchison's (1955a) first case and in one of ours the disease was well established before such therapy was begun.

Conclusion

The disease widespread in Central Europe and known originally as interstitial plasma-cell pneumonia of infancy is now recognised as an intra-alveolar infection due either to a protozoön, *Pneumocystis carinii* or to a fungus, possibly saccharomyces.

Five cases have now been reported in Britain of what we may in the meantime reasonably call pneumocystis pneumonia. If this disease is becoming more prevalent, increasing awareness of the possible diagnosis in atypical pneumonias of infancy may lead to more definite information about the cause.

Summary

Two fatal cases of pneumocystis pneumonia in infants are described. Of the four now reported from Scotland, two showed extreme deficiency of gamma-globulin ("agammaglobulinæmia"), and three of the infants were older than is usual in the Continental cases.

Pneumocystis pneumonia is characterised clinically by progressive tachypnœa, dyspnœa, cyanosis, and minimal clinical signs with gross radiological changes. On this basis we made a confident provisional diagnosis in one case during life.

Histologically the changes agree closely with those seen in the interstitial plasma-cell pneumonia of the European Continent.

Intra-alveolar networks and cysts are present, identical with those described by some as the causal protozoön, *Pneumocystis carinii* and by others as a pathogenic fungus.

Attempts to isolate the causal agent were unsuccessful.

We are grateful to Prof. A. C. Lendrum for his help and criticism during the preparation of this paper. Our thanks are also due to Mr. J. W. Corkhill for the illustrations, to Sister M. D. Crichton for her special care of the infants, and to all those colleagues mentioned in the text, who have been most generous with their help.

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THE SLUDGING OF BLOOD IN THE RETINAL VEINS

A LITTLE-KNOWN PHYSICAL SIGN

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With illustrations on plate

IT is the purpose of this paper to call attention to an ophthalmoscopic sign consisting of visible sludging or clumping of the red cells in the retinal veins when the blood-flow has been slowed by pressing on the eye. The sign is non-specific; but, since it is usually associated with organic disease, its presence may be helpful in prompting further investigation of patients who are thought to have no organic disease or who have an unconvincing history and physical signs.

Elicitation of Sign

The vessels at the optic disc are viewed through an ophthalmoscope, and pressure is exerted with the thumb of the free hand on the lateral aspect of the upper eyelid. Usually the pressure causes slight medial movement of the eye, but with a little practice distortion of its shape, which interferes with ophthalmoscopy, can be avoided. The pressure required is only enough to induce partial diastolic collapse in the retinal arteries. Attention is transferred to the retinal veins, where, if the sign is positive, the column of blood becomes at first granular and then forms into larger discrete particles which move slowly towards the disc (see figure). The time required for these to become obvious is usually about 5–8 seconds, and there is no point in prolonging the pressure if no response has been elicited. The rate at which the clumps pass along the veins varies with the pressure on the eye; but, as soon as flow speeds up, they immediately disintegrate.

After fairly lengthy pressure a slightly granular appearance in the retinal vessels may be induced even in some apparently healthy persons (particularly in women during menstruation), but only the formation of separate coarse granules is considered to have pathological significance.

In practice there is usually little doubt as to what constitutes a positive result; indeed it is not until some familiarity with the sign has been established that lesser degrees of granularity are appreciated.

Results

The present series comprises 90 patients in whom sludging was seen by me on one or more occasions. That sludging occurs only in certain conditions is shown by the fact that it was not seen in 31 healthy people (15 males and 16 females) or in 150 outpatients with the following disorders:

Disorder	No. of cases	Disorder	No. of cases
Functional disorders	33	Angina of effort	6
Peptic ulcer	17	Infection of renal tract	6
Neoplasm	9	Hiatus hernia	5
Chronic bronchitis	8	Miscellaneous	51
Spondylosis	8		
Hypertension	7	Total	150

Because of the obvious similarity of the phenomenon to the erythrocyte-sedimentation rate (E.S.R.), and since it was first seen by me in multiple myelomatosis, both the E.S.R. and the serum-globulin level were estimated to discover whether they had any relation to sludging, and also to provide objective indices of abnormality other than the clinical impression of disease.

The E.S.R. was estimated by Wintrobe's (1946) method, the upper limits of normal being taken as 12 and 20 mm. in one hour for males and females respectively, and the serum-globulin was estimated by Reinhold's (1953) method, the upper normal limit being 3·5 g. per 100 ml.

Of the 90 patients with sludging 79 had definite organic disease, as follows:

Disease	No. of cases	Disease	No. of cases
Active tuberculosis	17	Systemic lupus	3
Carcinoma	10	Reticulosis	3
Cirrhosis	6	Leukæmia	2
Bronchiectasis	6	Myocardial infarction	2
Myelomatosis	5	Ulcerative colitis	2
Pyrexia of undetermined origin	5	Miscellaneous	10
Pneumonia	4		
Rheumatoid arthritis	4	Total	79

In 11 no disease was found. 62 patients had raised E.S.R. —above 30 mm. in one hour in 49 of them. In 5 no figures were obtainable. 55 patients had raised serum-globulins —above 4 g. per 100 ml. in 35 of them. Either or both the E.S.R. and the serum-globulin were raised in 73 patients.

Of the 11 patients who had no definite organic disease all had normal E.S.R., and all but 1 had a normal serum-globulin. 2 of these 11 patients were pregnant, and another was first seen during the puerperium. Sludging was not present in this latter patient when reviewed three months later. Ploman's (1920) studies of this phenomenon were made mainly on pregnant women, and I have seen it in pregnancy on several occasions; so probably the effects of pregnancy were responsible for the sludging in the 2 pregnant women mentioned above.

4 other patients, reviewed at intervals varying from three to twelve months, showed no alteration in the sludging or any satisfactory explanation of it, but 1 of them had serum-globulin levels of 3·9 and 3·6 g. per 100 ml. over an interval of twelve months.

4 other patients did not attend for review, but 1 of them was known to be menstruating when seen, and this may explain the sludging, because I have observed it during menstruation in some (but not all) healthy women who do not show it during the intermenstrual period.

Of the 90 patients in the series, therefore, there were only 7 in whom no explanation for the sludging has yet been found.

Discussion

Agglutination of the formed elements of the blood in the retinal veins into macroscopically visible particles was observed by Reimar (1899), who did not correlate the phenomenon with the patient's disease. Independently of this observation, Fahraeus, as a result of his studies on the suspension stability of the blood, suggested to Ploman the possibility of observing rouleaux formation in vivo in the retinal veins. Ploman (1920) confirmed this and correlated the rate of formation of visible "clumps" with the E.S.R., but since then there seems to have been no further interest in the phenomenon in the retinal veins, although Wintrobe (1946) mentions its occurrence in myelomatosis. An extensive literature, summarised by Knisely (1951), has, however, accumulated on the sludging of blood in conjunctival and similar capillaries. This is almost certainly the same phenomenon as that observed in the retinal veins; but, because of the relatively elaborate apparatus required and ill-understood significance of sludging in vessels of this size, it has little clinical application at present.

Sludging in the retinal veins, on the other hand, is easily elicited and, being apparently much less sensitive than its capillary counterpart, has some clinical value.

The phenomenon is essentially qualitative; for, although Ploman tried to make it semiquantitative by timing the appearance of agglutinated particles, this is actually impracticable because they do not suddenly appear but build up gradually with no definite end-point. Moreover their rate of formation is affected by the rate of blood-flow and hence by the variable pressure on the eye.

I shall not here consider the factors responsible for sludging, and the E.S.R. and the serum-globulin estimations were mainly in the hope of providing objective indices of abnormality other than the clinical impression

of disease. In fact the E.S.R. and/or the serum-globulin levels were raised in about two-thirds of the patients; but both were also found raised in the absence of sludging, and the relation is evidently not close. A better correlation existed between sludging and the clinical condition; and sludging sometimes seems to be a more sensitive index of disease than either of these laboratory tests.

It must be admitted, however, that apparently false positive results may occur, for 11 of the patients had no obvious disease, although pregnancy in 2 and menstruation in 1 of these was almost certainly responsible.

It should also be emphasised that not all diseases are associated with sludging, and that its absence does not imply the absence of organic disease.

The value of the test is therefore limited; but, if pregnancy and menstruation are excluded as causes, the large majority of patients showing sludging will be found to have organic disease.

A surprising feature was the high proportion of patients who turned out to have either active tuberculosis or cancer, and it is clear that sludging may occur in a wide variety of diseases other than myelomatosis, which, so far as I know, is the only specific disease in which sludging in the retinal veins has hitherto been described (Wintrobe 1946).

In most patients the presence of organic disease was all too obvious and did not need confirmation. 14 patients, however, had complaints which were thought at first to be functional or of a simple non-inflammatory nature, and the finding of sludging suggested further investigations, which in each case disclosed a more serious unsuspected lesion, usually tuberculous or neoplastic.

The following 3 case-reports illustrate this application of the sign.

Case-reports

Case 1.—A man, aged 25, presented with a four-week history of severe sciatic pain attributed to a prolapsed intervertebral disc. The presence of sludging, however, was not in keeping with a purely mechanical cause for his pain, and further investigation revealed tuberculosis of the right sacro-iliac joint.

Case 2.—A woman, aged 28, was admitted with hæmatemesis. Sludging was noted after she had recovered from this and did not seem to be adequately explained by a peptic ulcer. Radiography revealed a gastric ulcer and active pulmonary tuberculosis.

Case 3.—A man, aged 55, presented with left-sided chest pain for which no cause was at first found. Radiography was normal. At a second attendance a month later sludging was observed, and the patient was admitted for further investigation, which disclosed erosion of the pedicle of the fourth thoracic vertebra, not previously present, and eventually found to be due to a metastatic adenocarcinoma.

Summary and Conclusions

Sludging or clumping of the red cells in the retinal veins when the blood-stream is slowed was observed in 90 patients. It was found almost exclusively in certain diseases, or in pregnancy and (to a lesser extent) during menstruation. It was sometimes associated with a raised erythrocyte-sedimentation rate and a raised serum-globulin level, but it may occur independently of either. Its sphere of usefulness is similar to that of the E.S.R., for it appears to be a fairly reliable indication of organic disease. It can, however, be elicited immediately and has been found to be particularly useful in bringing to light unsuspected organic disease in patients with few or unconvincing symptoms.

I wish to thank Prof. Robert Platt and Dr. H. T. Howat for permission to study their patients.

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"ESSENTIAL" FATTY ACIDS, DEGREE OF UNSATURATION, AND EFFECT OF CORN (MAIZE) OIL ON THE SERUM-CHOLESTEROL LEVEL IN MAN *

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THE serum-cholesterol level in man can be lowered by substitution of carbohydrate for the common meat and dairy fats in the diet, and this effect does not depend on the intake of cholesterol itself (Keys 1953, 1954, Keys et al. 1950, 1955, 1956). Different food fats, however, differ in their effect, and certain vegetable oils may depress the serum-cholesterol level (Ahrens et al. 1954, Bronte-Stewart et al. 1956, Friskey et al. 1955, Kinsell et al. 1952).

Ahrens et al. (1955) found corn (maize) oil particularly effective, and they suggested that the effects of dietary fats on the serum-cholesterol level in man depend on the relative degree of saturation of their constituent fatty acids. But corn oil has a relatively high content of the "essential" fatty acid linoleic acid; so it is intriguing to speculate on whether hypercholesterolæmia is an expression of a deficiency of essential fatty acid in the diet—a deficiency that could be corrected by the consumption of a fat, such as corn oil, rich in linoleic acid (Bronte-Stewart et al. 1956, Kinsell et al. 1956, Sinclair 1956).

One result of such considerations is enthusiasm for food fats even richer in linoleic acid, and/or more unsaturated than corn oil, as agents for combating hypercholesterolæmia and so, it is hoped, for preventing atherosclerosis and coronary heart-disease. We have urged caution about premature conclusions in this direction (Keys 1953), but already there is commercial interest in sunflower-seed oil, as a very rich source of linoleic acid, and in fish oils as the most unsaturated of the food fats. The fish industry is heartened by imaginative statements that coronary heart-disease is absent in Eskimos and rare in Norwegians because of their consumption of marine oils (Sinclair 1956), though actually the incidence of coronary heart-disease among Eskimos is entirely unknown and the disease is anything but rare in Norway.

Fish oils contain little or no linoleic acid and only minute amounts of arachidonic acid; so, if they were in fact more effective than corn oil in reducing serum-cholesterol, this would support the view that unsaturation is responsible. If, on the other hand, sunflower-seed oil were more powerful in decreasing blood-cholesterol, this would suggest that linoleic acid is the active agent. Obviously a direct comparison between corn, sunflower, and fish oils is essential.

Present Experiments

We have examined these and related questions in dietary experiments with physically healthy men in a completely controlled metabolic research unit of the Hastings State Hospital, and present here a summary of data on corn oil versus sunflower-seed oil, corn oil versus fish oil, and a final comparison with butter fat, as regards

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TABLE I—CHARACTERISTICS OF OILS TESTED

Item	Corn oil	Sunflower-seed oil	Sardine oil	Butter fat
Iodine number	120	131	188	32
Linoleic-acid content ..	45%	61%	0–2% (†)	3%

the serum-cholesterol level. Characteristics of the oils used are given in table I. The iodine numbers were determined in this laboratory, and the linoleic-acid content values are those published for samples of these fats of similar iodine number.

The test oils were fed in quantities of 100 g. daily as part of a diet constant in all other respects and designed to provide an average of 100 g. of proteins, 300 mg. of cholesterol, and 40 g. of mixed food fats in addition to the test oil. Calorie balance was maintained by individual adjustments in bread and jelly, and a fixed level of physical activity was maintained throughout. The subjects were 26 schizophrenics selected for physical health, metabolic normality, and demonstrated coöperativeness.

Before the experiments with these oils the men were all maintained at calorie balance on a fixed diet for several months, including a stabilising period of four weeks with 100 g. of butter fat. The men were divided into four groups matched as to age, relative obesity, and habitual level of voluntary activity. The design of the experiment with the test oils is shown in table II. Groups W and X contained 7 men each, and groups Y and Z contained 6 men each.

The mean values of the four groups for age, initial and final body-weights, and daily consumption of calories

TABLE II—EXPERIMENTAL DESIGN FOR FEEDING CORN OIL, SUNFLOWER-SEED OIL, SARDINE OIL, AND BUTTER FAT

Inclusive dates	Group			
	W	X	Y	Z
June 8–21 ..	Corn	Sunflower	Corn	Sardine
June 22–July 5 ..	Sunflower	Corn	Sardine	Corn
July 6–21 ..	Butter	Butter	Butter	Butter

are given in table III. For the entire 26 men the mean body-weight changed only by 0·19 kg. from the start to the end of the tests, demonstrating the accuracy of the calorie equilibrium maintained by the diets.

Samples of blood were drawn at the end of each week and analysed for serum total-cholesterol (in duplicate) and the cholesterol in the α and β lipoprotein fractions of the serum, separated by paper electrophoresis. The methods have been described by Anderson and Keys (1956). Here, for the sake of brevity, it is enough to consider only the mean blood-cholesterol levels at the end of the second week on each diet; the levels at the end of the first week are similar and show, as we have found before (Keys et al. 1950), that a large part of the cholesterol response to a change in diet is produced in the first week.

TABLE III—MEAN VALUES FOR EXPERIMENTAL GROUPS JUNE 8–JULY 21

Item	W	X	Y	Z
Age (yr.)	46·4	46·8	48·4	48·7
Initial body-weight (kg.) ..	69·7	67·3	65·7	66·2
Final body-weight (kg.).. ..	70·0	67·1	66·2	66·6
Intake of calories daily ..	3375	3391	2922	3074

Results

The average serum-cholesterol level on the butter-fat diet was 216·9 mg. per 100 ml. All the groups had significantly lower serum-cholesterol levels on the corn-oil diet, the average difference being 45·1 mg. per 100 ml. for the W and X groups and 60·0 mg. for the Y and Z groups. The serum-cholesterol levels were also lower on the sunflower-seed-oil diet ($\Delta = 35{\cdot}8$ for W and X groups) and on the sardine-oil diet ($\Delta = 39{\cdot}8$ for Y and Z groups). These differences were primarily due to changes in the β-lipoprotein-cholesterol level. The most interesting results, however, are for the direct crossover comparisons summarised in table IV.

In the change of 7 men from corn oil to sunflower-seed oil, and in the reverse change made simultaneously with

TABLE IV—DIFFERENCES IN SERUM TOTAL-CHOLESTEROL LEVEL AND IN PERCENTAGE OF TOTAL CHOLESTEROL IN THE β-LIPOPROTEIN FRACTION OF SERUM

Diet comparison	No. of men	Total cholesterol (mg. per 100 ml.)	% of total cholesterol in β lipoprotein
Corn-sunflower ..	14*	−9·29 ± 2·81	−1·08 ± 2·16
Corn-sardine ..	12	−20·17 ± 3·75	−4·25 ± 1·34

* For total cholesterol; 12 men only for β-lipoprotein (one value missing in each of the groups W and X).

the other 7 men, the serum total-cholesterol was higher on the sunflower-seed oil than on the corn oil, the difference being statistically significant at about the 1% level of probability. In groups Y and Z the serum-cholesterol level was higher on sardine oil than on corn oil, the difference being highly significant ($t = 5{\cdot}38$; and, at 11 degrees of freedom, $P < 0{\cdot}001$). As in the case of the comparisons with butter fat, the cholesterol in the β-lipoprotein fraction seems to be primarily involved in the total cholesterol differences; the percentage of the total cholesterol found in the β fraction tends to be lowest when the men are on the corn-oil diet.

The net result is that both sardine oil and sunflower-seed oil are more, rather than less, cholesterol-increasing than is corn oil. Or, to put it the other way round, corn oil has the greatest cholesterol-depressing effect of the fats tested. The attempt to discover whether the high content of essential fatty acids or the high degree of unsaturation is responsible for the cholesterol-depressant action of corn oil had the surprising result of showing that corn oil is remarkable in some way not measured by either of these two characteristics.

Discussion

While the above findings were being belatedly summarised for publication, Jones et al. (1956) reported, in cholesterol-fed chicks, an anti-cholesterol effect of corn oil, and still more so of corn germ, and provided evidence that this effect cannot be explained on the basis of the fatty-acid composition of the oil. The results of other experiments on animals had cast serious doubt on the validity of both the unsaturation and the essential-fat hypotheses of the control of the serum-cholesterol level (Lin et al. 1955, Swell et al. 1955). Unfortunately the differences between animal species in the metabolism of fat and cholesterol make it dangerous to extrapolate from such experiments to man. It is not possible to state, for example, what may be the relevance to man of the interesting observation that rabbits fed a diet high in peanut oil but low in saturated fat and devoid of cholesterol slowly develop progressive hypercholesterolæmia and, within a year, atherosclerosis (Steiner and Dayton 1956). Perhaps this finding is most significant as a warning against judging the ultimate cholesterogenic and atherogenic effects of diets on the basis of short-time experiments.

It is interesting to ask what may be the relevance of the present experimental findings to the fact that low serum-cholesterol levels are characteristic of human populations who habitually subsist on low-fat diets (Keys 1953, 1954, Keys et al. 1955). Are such low serum-cholesterol levels explained by the low-fat diets, or do relatively high intakes of essential or highly unsaturated fatty acids contribute to the picture? The intake of linoleic or combined polyethenoic fatty acids in the average American diet is about twice that in the typical low-fat diets of Japan and Italy, which are associated with average serum-cholesterol levels of only about 150–200 mg. per 100 ml. No natural human diets approach the situation of the present experiments where 50–60 g. of linoleic acid was ingested daily (in the experiments with corn oil and sunflower-seed oil) or where fish oils accounted for nearly 30% of the total calories. Even among the fish-eating Japanese no more than 2–3% of the total calories is supplied in the form of fish oils.

As populations increase the fat content of their diets, they do so by consuming more saturated *and* unsaturated fats, though the increase in the latter is smaller. It seems, then, that among most of the populations of the world the characteristic serum-cholesterol levels are directly related to the total consumption of fat rather than inversely related to the consumption of essential or highly unsaturated fatty acids. And, if we are to advocate dietary alterations on a population scale to control the serum-cholesterol level, it seems wiser to attempt to reverse the trend towards more and more luxurious high-fat diets than to advise consuming more vegetable and fish oils as a counter measure. But in so far as there is simply a choice of the kind of fat to be used, corn oil may have special virtue.

Summary

Serum total and β-lipoprotein cholesterol levels were measured in rigidly controlled experiments on 26 men in calorie balance on a diet constant in all respects except for the character of test fats—corn oil, sunflower-seed oil, sardine oil, and butter fat—which were fed in quantities of 100 g. daily. Other mixed food fats in the diet amounted to 40 g. daily, and total fats represented 39·8% of the total calories.

The mean serum total-cholesterol level on the butter-fat diet was 52·0 mg. per 100 ml. higher than on the corn-oil diet, 35·8 mg. higher than on the sunflower-seed-oil diet, and 39·8 mg. higher than on the sardine-oil diet.

The serum total-cholesterol level rose after the change from corn oil to sunflower-seed oil and fell after the reverse change, the average difference being 9·3 mg. per 100 ml.

The serum total-cholesterol level rose after the change from corn oil to sardine oil and fell after the reverse change, the average difference being 20·2 per 100 ml.

The level of cholesterol in the β-lipoprotein fraction of the serum was primarily involved in the above changes.

These findings do not support the view that the serum-cholesterol level in man is a simple inverse function of the essential fatty-acid content or of the degree of unsaturation of the fatty acids in the diet.

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EFFECT OF HYPOTENSIVE DRUGS ON RENAL FUNCTION IN CHRONIC RENAL DISEASE

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HIGH blood-pressure is one of the commonest and most serious complications of all forms of acute and chronic primary renal disease. The possible mechanisms involved in the production of such hypertension have recently been reviewed (Wilson 1953). Therapeutic reduction of the blood-pressure is justified by the well-established experimental evidence that hypertension may cause renal vascular damage and progressive deterioration in function. Secondary hypertensive lesions in the kidney constitute the most serious prognostic factor in certain forms of chronic Bright's disease and probably play an important part in the development of the malignant type of hypertension which occurs in many cases.

Within recent years the medical treatment of hypertension has become feasible, following the introduction of different drugs which effectively lower blood-pressure. Many reports describe the satisfactory use of these drugs, but analysis of these shows little correlation between treatment and the ætiology of the hypertension in the individual case. Most are concerned solely with the hypotensive effect of the drugs, and apparently most of the cases of hypertension so treated were of the essential variety without impairment of renal function.

Nevertheless a diagnosis of the underlying cause is essential for accurate prognosis and rational therapy. The rôle of hypertension varies considerably in different forms of renal disease, and treatment that might be beneficial in some cases may well be harmful in others.

The indications for lowering blood-pressure may be classified as symptomatic or prophylactic.

Symptomatic indications include heart-failure (both the acute left ventricular and the chronic congestive varieties), encephalopathy, and retinopathy. In this paper we have used the term retinopathy to indicate at least the presence of retinal hæmorrhages and exudates. We believe that, in renal disease, the appearance of these retinal changes, whether or not visual impairment is present, constitutes an absolute indication for lowering the blood-pressure. The advent of papilloedema indicates the onset of the malignant phase of hypertension; and, in the absence of therapy, rapid deterioration due to renal vascular damage, heart-failure, or encephalopathy is inevitable. Heart-failure may reduce glomerular filtration and lead to nitrogen retention in chronic renal disease; hence its relief by hypotensive therapy may well lead to improvement in renal function. The *prophylactic indications* call for prolonged observation and treatment. Here the

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aim of therapy is to prevent deterioration in renal function caused by the secondary effects of hypertensive vascular damage to the kidney and to delay the onset of the malignant phase.

To assess the results of treatment it is imperative to take into account the natural history of untreated renal hypertension. The exact nature of the renal lesion is important, for the course and prognosis of different forms of nephritis vary greatly. It is important also to estimate the relative contributions of nephritis and hypertension to the progress of the disorder in the individual case.

Many patients with chronic renal disease live for years with normal renal function and slight or moderate hypertension. Chronic type-I nephritis in its slowly progressive course (Ellis 1942), may behave in this way, and so also may chronic pyelonephritis. When eventually incapacitating symptoms appear these are usually of hypertensive rather than renal origin. After many years of slight or moderate hypertension, a relatively steep rise in blood-pressure commonly occurs, accompanied or followed by a rapid deterioration in renal function. If no active steps are taken to reduce the blood-pressure, malignant hypertension supervenes in about half the cases; in the remainder a more slowly progressive uræmia develops. Fig. 1 illustrates a typical case of this "hypertensive transformation" (Wilson 1955).

Some patients with kidney disease present a different picture. In them there is obviously a continuing active glomerulonephritis, indicated by anæmia, microscopic hæmaturia, and frequent granular casts in the urine. Here the primary renal condition has evidently a more significant effect on the natural history of the disease than have secondary hypertensive changes. Although, in these patients, hypotensive therapy may be necessary to control encephalopathy or retinopathy, the same degree of benefit is not to be expected as in the previous group. It is particularly in the more severe cases of type-II nephritis that this progressive inflammatory element is found, and

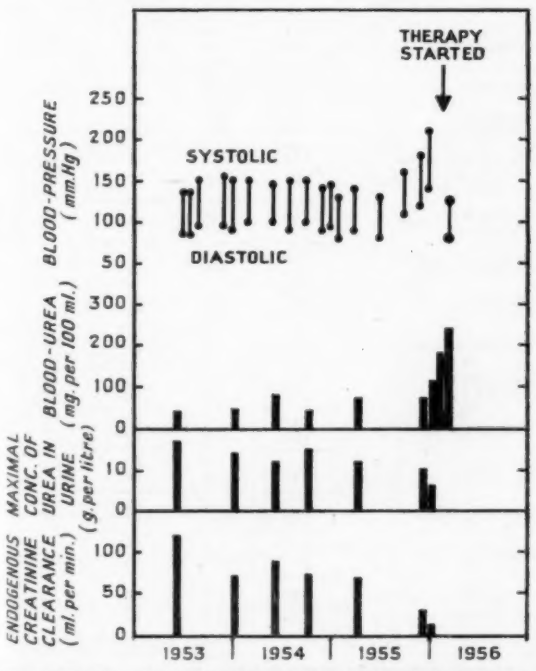

Fig. 1—Case 17: chronic type-II nephritis showing rapid deterioration of renal function associated with rise in blood-pressure. Although hypertension was controlled, renal failure was progressive.

in such cases deterioration of renal function may antedate the terminal rise in blood-pressure.

With these considerations in mind we studied the effect on renal function of lowering the blood-pressure in patients with hypertension and renal impairment. We wanted, first, to determine whether normotension could be achieved without provoking acute deterioration in renal function; this was readily established in a series of comparatively short-term observations. Secondly, patients with renal hypertension were observed for longer periods in an attempt to discover whether the usual deterioration in renal function could be retarded or even halted, and whether the onset of hypertensive complications, particularly the malignant change, could be prevented. Thirdly, we were interested to see whether the different types of renal disease described above differed in their response to hypotensive therapy.

Clinical Material and Selection of Cases

All the patients reported in this series were treated in the nephritis clinic of the London Hospital, and selection followed the indications outlined above. Treatment was instituted either for the relief of acute hypertensive manifestations, such as heart-failure, encephalopathy, and retinopathy, or for prophylactic purposes. In the former group the hypertension was usually severe when the patient was referred to us, and renal impairment and retinopathy were often present. In most of these patients the diagnosis was chronic type-I nephritis. Patients with type-II nephritis, on the other hand, had usually been under observation for months or years with normal renal function and little or no hypertension. This afforded a good opportunity for correlating the development of hypertension with change in the renal function and for starting treatment when the blood-pressure began to rise. Some of these patients were free from symptoms when hypotensive therapy was begun.

Observations were made on 32 patients—16 with chronic type-I nephritis, 7 with type-II nephritis, 4 with other forms of renal disease, and 5 with essential malignant hypertension. The last-named are included for comparison with primary renal disease. Renal function was impaired in all the cases at the time therapy was begun. The clinical details and particular indications for treatment are listed in tables I–IV.

Methods

Treatment followed standardised lines. Initially ganglion-blocking agents alone were used—always by injection—and pentolinium ('Ansolysen') was the drug of choice. More recently we have used reserpine ('Serpasil') in combination with ansolysen by mouth or 'Ecolid' (4 : 5 : 6 : 7-tetrachloro-2-(2-dimethylaminoethyl) iso-indoline dimethochloride) also by mouth. All the patients were admitted to hospital for preliminary investigation and initial therapy. Their blood-pressures were recorded hourly throughout the day in the standing and lying positions. After about a week hypotensive drugs were administered and further blood-pressure curves were obtained, the dosage of the ganglion-blocking agent being gradually increased until an optimal effect was gained.

The régime was varied to suit the patient's requirements and idiosyncrasies; sometimes the blocking agent was given twice and sometimes thrice daily, but always at least half an hour before food. We found it unnecessary to give more than 1 mg. of serpasil daily in divided doses, and often 0·25 mg. twice daily sufficed. In a few cases serpasil alone proved effective, but there appears to be no means of foretelling such a response.

Renal function was measured before therapy was started and again after two to four weeks, when optimal lowering of blood-pressure had been achieved. After

discharge from hospital the patients were seen monthly in the outpatient department, and renal function tests were repeated at regular intervals. Any cardiac deterioration, or improvement, was checked by serial electrocardiograms and chest radiographs. We used the blood-urea level, urine-urea concentration, and creatinine clearance as tests of renal function, being well aware of their inherent fallacies.

Experience has shown that, in the individual case, this group of tests, performed at regular intervals, satisfactorily indicates the general trend of renal function. Reliance should not be placed, however, on any individual reading, for discrepancies arise from variations in urine output, superimposed extrarenal retention of nitrogen, or incomplete emptying of the bladder.

Results

Control of Blood-pressure

High blood-pressure due to renal disease responds to hypotensive drugs in much the same way as essential hypertension, and there seems to be no greater resistance to therapy. Indeed some patients are remarkably sensitive to these drugs, possibly owing to delayed excretion (Harington 1953).

Our results suggest that papillœdema responds more rapidly than in malignant essential hypertension; in all the cases of primary renal disease reported here papillœdema had subsided within a month of treatment being started.

Most patients with malignant essential hypertension require larger doses of hypotensive drugs than are needed to control renal hypertension. We have rarely had to give more than a total of 200 mg. daily of ecolid by mouth together with 0·5–1·0 mg. of serpasil, and normotension has often been attained with a lower dosage. In our cases of essential malignant hypertension 400 mg. of ecolid daily has sometimes proved insufficient, even when combined with serpasil, and papillœdema has been correspondingly refractory.

We believe that the blood-pressure should be brought as near normal as possible in all cases, the dose being progressively increased to the limit of the patient's tolerance.

Immediate Effect of Lowering Blood-pressure on Renal Function

In tables I–IV are listed the renal function and blood-pressure immediately before treatment, and again after two to four weeks in hospital, when optimal control of blood-pressure had been achieved. Such observations were available in 14 patients with chronic type-I nephritis. The blood-urea level did not change significantly in 10 cases, rose in 3, and fell slightly in 1. The other tests of renal function showed substantially the same results. In

TABLE I—SHORT-TERM EFFECTS OF HYPOTENSIVE THERAPY IN CHRONIC TYPE-I NEPHRITIS

Case no.	Sex	Age (yr.)	Blood-pressure (mm. Hg)	Indications for therapy	Drugs used	Renal function † Before and after treatment: Blood-urea (mg. per 100 ml.)	Max. conc. urea in urine (g. per 100 ml.)	Creatinine clearance (ml. per min.)	Interval ‡ (weeks)
1	M	39	240/160	Retinopathy *	1. Ansolysen inj. 2. Serpasil + Ansolysen oral	59 57	1·45 2·5	87 58	4
2	M	60	240/140	Retinopathy	Serpasil + Ecolid	57 60	1·08 1·5	49 58	2
3	M	52	220/120	Rising B.P.	Serpasil	197 159	0·55 0·6	5 6	2
5	M	54	210/145	Papillœdema	Serpasil + Ecolid	95 125	1·0 1·4	25 45	4
7	M	54	250/170	Papillœdema Congestive heart-failure	1. Ansolysen inj. 2. Serpasil + Ansolysen oral	72 70	1·3 1·8	35 96	4
8	M	39	190/115	Retinopathy	Serpasil + Ansolysen oral	45 73	1·3 1·5	.. ..	4
9	M	70	300/180	Retinopathy	Ansolysen inj.	136 134	1·58 0·8	53 34	4
10	F	27	220/140	Retinopathy	Serpasil + Ecolid	45 50	1·44 1·2	45 44	2
11	F	21	240/140	Papillœdema	Ansolysen inj.	105 95	1·2 1·4	24 23	4
12	M	45	235/150	Papillœdema	Serpasil + Ecolid	90 80	1·7 1·2	25 40	4
13	M	42	230/160	Retinopathy, lt heart-failure	Ansolysen inj.	57 60	1·7 1·8	42 50	4
14	M	53	240/140	Rising B.P.	1. Ansolysen inj. 2. Ansolysen, oral	159 155	0·6 0·6	23 16	3
15§	M	48	270/170	Papillœdema	Ansolysen inj.	66 99	1·4 2·2	53 31	4
	,,	49	260/170	Papillœdema	Ansolysen inj.	71 117	1·4 1·7	29 26	4
16	M	40	200/140	Rising B.P.	1. Serpasil + Ansolysen oral 2. Serpasil only	40 45	1·25 1·4	75 90	4

* "Retinopathy" denotes presence of exudates or hæmorrhages or both.

† Normal values: (*a*) blood-urea upper limit 40 mg. per 100 ml.; (*b*) maximal concentration of urea in urine lower limit 2 g. per 100 ml.; (*c*) creatinine clearance lower limit 80 ml. a minute.

‡ "Interval" is the time separating the two sets of observations, before and after treatment.

§ Case 15 was treated in two episodes of malignant hypertension a year apart.

TABLE II—SHORT-TERM EFFECTS OF HYPOTENSIVE THERAPY IN RENAL HYPERTENSION FROM CAUSES OTHER THAN GLOMERULONEPHRITIS

Case no.	Sex	Age (yr.)	Diagnosis	Blood-pressure (mm. Hg)	Indications for therapy	Drugs used	Renal function: Before and after treatment: Blood-urea (mg. per 100 ml.)	Renal function: Before and after treatment: Max. conc. urea in urine (g. per 100 ml.)	Renal function: Before and after treatment: Creatinine clearance (ml. per m.n.)	Interval (weeks)
24	M	56	Polycystic disease	260/185	Congestive heart-failure	Serpasil Ecolid	171 180	0·5 0·6	22 22	2
25	F	22	Amyloid kidney	200/125	Lt heart-failure	Serpasil Ecolid	126 120	0·6 0·4	11 18	2
26	M	26	Pyelonephritis	265/170	Papilloedema	Serpasil Ecolid	50 60	1·2 1·6	70 70	4
27	M	35	Amyloid kidney	195/120	Rising B.P.	Ansolysen inj.	51 51	1·4 1·6	36 44	3

the great majority of cases of type-I nephritis, therefore, hypotensive therapy had no immediate harmful effects.

The same may be said of the results obtained in renal hypertension from causes other than nephritis (table II, cases 24–27) and in malignant essential hypertension (table III, cases 28–32). There was no evidence in these groups that lowering the blood-pressure was detrimental to renal function, and neither the age of the patient, the sex, the degree of hypertension, nor the extent of renal impairment at the start of therapy seemed to make any difference to the result.

In type-II nephritis, however (table IV, cases 17–23), the results were somewhat different. There were 7 patients in this category, and in 4 the renal function was definitely worse after this short period of treatment, whilst in 3 it was unchanged. 1 patient (case 17) died in uræmia two months after therapy was begun. Lowering of the blood-pressure probably played little part in this deterioration, for in all 4 cases where it was observed there had been a rapid worsening of renal function just before treatment was started. This sequence is illustrated in fig. 1. It seems likely that, in these cases, renal failure was the result of severe progressive glomerulonephritis.

TABLE III—SHORT-TERM RESULTS OF HYPOTENSIVE THERAPY IN MALIGNANT ESSENTIAL HYPERTENSION WITH RENAL IMPAIRMENT

Case no.	Sex	Age (yr.)	Blood-pressure (mm. Hg)	Drugs used	Renal function: Before and after treatment: Blood-urea (mg. per 100 ml.)	Renal function: Before and after treatment: Max. conc. urea in urine (g. per 100 ml.)	Renal function: Before and after treatment: Creatinine clearance (ml. per min.)	Interval (weeks)
28	M	48	230/180	1. Ansolysen inj. 2. Serpasil + Ecolid	40 45	1·6 1·6	65 75	4
29	M	37	280/160	Serpasil + Ecolid	39 45	1·6 1·2	53 45	3
30	M	32	250/160	Hexamethonium inj.	42 51	1·02 1·0	88 138	4
31	M	52	260/160	Serpasil + Ecolid	73 47	1·7 1·4	56 53	4
32	M	63	230/140	Serpasil + Ecolid	57 51	3·3 2·4	100 ..	3

Long-term Results

The long-term results of therapy lend themselves less readily to analysis than the short-term. Only those patients who were treated with hypotensive drugs for at least six months have been included, and for several reasons these are few.

When treatment was started, many patients were seriously ill, with poor renal function, very high blood-pressure, and other serious complications; 3 died in uræmia in less than six months (cases 3, 17, and 24). Moreover several patients, especially those who were treated for prophylactic reasons, were unwilling to persevere with a treatment which produced unpleasant symptoms. Thus 6 abandoned treatment and have been excluded (cases 9, 11, 15, 16, 23, and 27). In addition 7 patients have not yet been treated for six months (cases 2, 8, 10, 19, 21, 25, and 29).

A further complicating factor is the variable degree of control of the blood-pressure in the individual case; for, though normotension was readily obtained during the initial period of treatment, the blood-pressure often rose after discharge from hospital. This may have been due either to acquired tolerance to the drug or to lack of

TABLE IV—SHORT-TERM RESULTS OF HYPOTENSIVE THERAPY IN TYPE-II NEPHRITIS

Case no.	Sex	Age (yr.)	Blood-pressure (mm. Hg)	Indications for therapy	Drugs used	Renal function: Before and after treatment: Blood-urea (mg. per 100 ml.)	Renal function: Before and after treatment: Max. conc. urea in urine (g. per 100 ml.)	Renal function: Before and after treatment: Creatinine clearance (ml. per min.)	Interval (weeks)
17	F	22	210/140	Retinopathy	Serpasil + Ecolid	111 156	0·6 0·7	12 7	4
18	M	44	225/125	Rising B.P.	Serpasil	45 40	1·7 1·8	50 48	4
19	M	37	225/125	Lt heart-failure	Serpasil + Ecolid	158 210	0·8 0·9	9 ..	2
20	F	29	230/125	Retinopathy	Ansolysen inj.	64 68	0·8 0·75	27 25	2
21	F	25	220/130	Rising B.P.	Serpasil + Ecolid	48 54	1·2 0·6	36 33	2
22	F	25	180/110	Rising B.P.	Serpasil + Ecolid	63 84	0·9 0·7	18 18	2
23	M	31	270/120	Papilloedema	Ansolysen inj.	132 121	.. 0·6	33 24	4

coöperation. We encouraged all the patients to return to a normal active life, and increased physical activity may have diminished their response to hypotensive drugs. In some patients dosage was satisfactorily readjusted; in others this was impossible, and we had to be content with a suboptimal lowering of the blood-pressure.

The control of blood-pressure during long-term treatment was classified as good if the blood-pressure fell to 150/100 mm. Hg or below in the standing position; poor if the diastolic pressure was persistently above 120 mm. Hg; and fair between these extremes.

16 patients were treated for six months or longer (table v). The diagnosis in 8 of these was chronic type-I nephritis, in 3 type-II nephritis, in 1 chronic pyelonephritis, and in 4 malignant essential hypertension. Of the patients with type-I nephritis, renal function improved in 2, remained unchanged in 2, and became worse in 4.

The period of treatment varied between seven and twenty-four months, and, not unexpectedly, the degree of renal impairment at the start of therapy was important in prognosis.

An example of a good therapeutic response is shown in fig. 2. In the 4 patients whose renal function deteriorated the initial creatinine clearance was low (23–52 ml. per minute), the average being just under 34 ml. The initial blood-urea level was more variable but was above 70 mg. per 100 ml. in 3 cases. The patient with pyelonephritis (case 26) showed persistent improvement in renal function after seven months' therapy; but there was only slight renal impairment when treatment was started.

4 patients with malignant essential hypertension were treated for periods of six months to four years. Renal function has not deteriorated in any. Renal impairment was greatest in case 31 (blood-urea 73 mg. per 100 ml., creatinine clearance 56 ml. per minute); in the other 3 patients it was only slight.

2 of the 3 patients with type-II nephritis showed deterioration in renal function after treatment for twenty-six and six months; both had grossly impaired renal function at the onset (creatinine clearances 27 and 18 ml. per minute). In the 3rd patient the creatinine clearance was initially 50 ml. per minute, and treatment has been maintained for nine months without apparent deterioration. With 1 exception, patients in any group who showed no deterioration of renal function on prolonged hypotensive therapy had an initial creatinine clearance of 50 ml. per minute, or more (range 25–100 ml., average value 67 ml.).

Mortality

There were 3 deaths in this long-term series, all examples of chronic type-I nephritis.

One patient, in whom papilloedema was initially observed, died of cerebral hæmorrhage after eighteen months, during which time control of blood-pressure was considered poor (case 7). A cerebrovascular accident was the cause of death in a 2nd patient (case 13), after fifteen months' therapy, with only fair control of blood-pressure; at the beginning of treatment this patient had severe retinopathy and left heart-failure. The 3rd patient died from uræmia, after fourteen months' therapy, with fair

TABLE V—LONG-TERM EFFECTS OF HYPOTENSIVE THERAPY ON RENAL FUNCTION

Case no.	Sex	Age (yr.)	Diagnosis	Renal function: Before and after treatment — Blood-urea (mg. per 100 ml.)	Max. conc. urea in urine (g. per 100 ml.)	Creatinine clearance (ml. per min.)	Interval (months)	Control of blood-pressure	Comment on renal function
1*	M	39	Chronic type-I nephritis	59 45	1·45 2·2	87 80	24	Good	Improved. Alive
12	M	45	Chronic type-I nephritis	90 60	1·7 1·4	25 38	10	Poor	Improved. Alive
4	M	42	Chronic type-I nephritis	73 60	1·89 1·86	73 62	7	Poor	Unchanged. Alive
6	M	44	Chronic type-I nephritis	60 57	1·2 1·2	60 57	18	Good	Unchanged. Alive
5	M	54	Chronic type-I nephritis	95 200	1·0 1·1	25 12	8	Fair	Worse. Alive
7	M	54	Chronic type-I nephritis	73 70	1·2 0·9	35 22	18	Poor	Worse. Died of cerebrovascular accident
13	M	42	Chronic type-I nephritis	57 75	1·7 2·0	52 34	15	Fair	Worse. Died of cerebrovascular accident
14	M	53	Chronic type-I nephritis	159 400	0·6 ..	23 ..	14	Fair	Worse. Died of renal failure
26	M	26	Pyelonephritis	50 40	1·2 2·0	70 80	7	Fair	Improved. Alive
18	M	44	Type-II nephritis	47 42	1·7 1·8	50 48	9	Good	Unchanged. Alive
20	F	20	Type-II nephritis	64 108	0·8 0·6	27 32	26	Good	Worse. Alive
22	F	25	Type-II nephritis	63 108	0·9 0·9	18 8	6	Fair	Worse. Alive
28	M	48	Malignant hypertension	40 40	1·6 2·1	65 80	24	Fair	Improved. Alive
31	M	52	Malignant hypertension	73 47	1·7 2·04	56 80	12	Fair	Improved. Alive
30	M	32	Malignant hypertension	42 40	1·02 0·95	88 100	48	Fair	Unchanged. Alive
32	M	63	Malignant hypertension	57 42	3·3 3·12	100 51	6	Poor	Unchanged. Alive

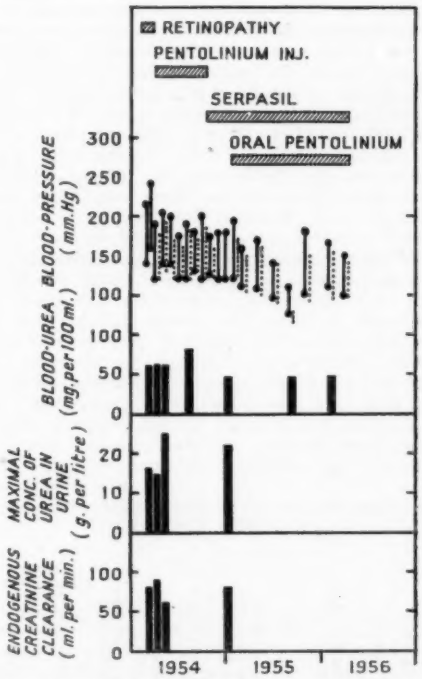

Fig. 2—Case 1: chronic type-I nephritis showing sustained control of hypertension by serpasil and pentolinium without further deterioration in renal function over 2 years. B.-P. in lying position is represented by continuous lines, and in standing position by interrupted lines.

control of blood-pressure (case 14); here renal failure was advanced when the patient was first seen, and therapy was only undertaken with considerable misgivings for the relief of symptoms.

Few conclusions should be drawn from these fatalities, but cerebral hæmorrhage still remains an important cause of death, and here the effectiveness of controlling the blood-pressure may well be important. In none of these fatal cases was there a malignant termination—i.e., appearance or reappearance of papillœdema was not observed.

In the whole series of 32 patients other deaths occurred either before six months' therapy had been concluded or after therapy had been discontinued. These fatal cases are considered below.

Discussion

Several reports have been published of the pharmacological actions on the renal circulation in man of ganglion-blocking agents and other hypotensive drugs:

Mackinnon (1952) found that, both in normotensive subjects and in patients with benign or malignant essential hypertension, pentamethonium iodide reduced the glomerular filtration-rate and effective renal blood-flow. The reduction in renal blood-flow was greater than could be explained by the fall in blood-pressure—indicating a selective vasoconstrictor effect on the kidney.

Similar results were obtained with hexamethonium by Moyer and Mills (1953); the ætiology of the hypertension was not specified.

According to Moyer et al. (1955) and Andreae and Smith (1955) the rauwolfia alkaloids have no direct effect on renal hæmodynamics.

'Apresoline' (hydrallazine), on the other hand, increases renal blood-flow (Mackinnon 1952); and it therefore appears to be the drug of choice when ischæmic renal disease is present. Unfortunately we have found it valueless in chronic renal hypertension.

If the above results were applicable to patients with impaired renal function we might expect ganglion-blocking drugs to cause further deterioration, but clinical experience has not substantiated this:

Morrison (1953) treated hypertensive patients with parenteral hexamethonium and reported that, of 5 with initially a raised blood-urea level, 3 showed no further rise during treatment, and in 2 the observed rise was no more than would be expected in the natural course of the disease.

In a series reported by Harington and Rosenheim (1954) 9 patients were treated when the blood-urea level was above 40 mg. per 100 ml.; in 4 of these the level rose with treatment and in 5 it fell. These workers concluded that renal disease was no contra-indication to treatment with ganglion-blocking agents.

Our results support these earlier observations. Evidently the changes in renal hæmodynamics observed in an acute experiment bear no definite relation to the therapeutic response which follows long-confirmed lowering of the blood-pressure.

Ellis (1942), comparing the histological findings in type-I nephritis and type-II nephritis, wrote:

"Of special significance is the difference in the chronic stage, for whereas in type 1 nephritis the early lesions give place to secondary hypertensive changes resulting in focal renal destruction, in chronic type 2 nephritis there is a progressive glomerular hyalinisation with diffuse renal destruction in which the hypertensive process appears to play relatively little part."

The results which we report here lend support to this observation, for it was in chronic type-I nephritis that the treatment of hypertension was most satisfactory. A similar result might be expected in chronic pyelonephritis. In type-II nephritis, on the other hand, where hypertensive vascular damage is not conspicuous and there is evidence of progressive renal destruction from the nephritic process, the results of hypotensive therapy are disappointing.

There have been 11 deaths in this series; the 3 which took place after prolonged hypotensive therapy have already been discussed. 4 patients died during the first six months of therapy; 2 of these had chronic type-I nephritis with severe renal failure (cases 3 and 9) at the start of treatment; the 3rd was an elderly man with a blood-urea of 171 mg. per 100 ml. due to polycystic disease (case 24); and the 4th was a girl, with very active type-II nephritis, who died in uræmia after three months' treatment (case 17). Thus there were 7 deaths during therapy; in 5 the cause was uræmia and in 2 a cerebral vascular lesion. There was no instance of a malignant termination.

4 other patients died after they had abandoned treatment (cases 11, 15, 23, and 27). In 2 there was a malignant termination (cases 11 and 23); and 2 died in uræmia without the development of papillœdema (cases 15 and 27).

From these figures it is obvious that hypotensive drug therapy was of little use in the late stages of renal failure. The important fact remains, however, that, when renal function was only slightly impaired, adequate control of the blood-pressure in patients with chronic type-I nephritis or malignant essential hypertension was not accompanied by any serious deterioration in renal function over the period of observation. In addition to this possible prophylactic effect, symptomatic improvement was striking in most instances. Most of our patients had severe headaches, some had distressing dyspnœa, and some had impaired vision. Hypotensive therapy provided relief in such cases and for this reason alone appeared well justified—regardless of the ultimate prognosis.

Summary and Conclusions

27 patients with primary renal disease, hypertension, and impairment of renal function, were treated with

hypotensive drugs. 5 patients with malignant essential hypertension and renal impairment were included for comparison.

The results of therapy depend largely on the initial degree of renal impairment and partly on the type of renal disease. Usually cases of chronic type-I nephritis, pyelonephritis, and malignant hypertension showed no deterioration of renal function when the initial creatinine clearance was over 50% and the blood-urea level below 60 mg. per 100 ml. Renal failure progressed when the initial creatinine clearance was below 30% and the blood-urea above 70 mg. In chronic type-II nephritis the results are less favourable.

Adequate control of the blood-pressure seems to prevent the malignant hypertensive termination in renal disease, but cerebral vascular accidents still happen.

Hypotensive therapy had no value in staying the onset of renal failure in type-II nephritis. There was no satisfactory evidence that lowering the blood-pressure was responsible for deterioration of renal function in these patients, but that possibility must be considered.

The need for accurate diagnosis of the renal lesion, before hypotensive therapy is given, is emphasised.

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RENAL HÆMODYNAMIC EFFECTS OF HYPOTENSIVE DRUGS

I. ACUTE EFFECTS OF HEXAMETHONIUM BROMIDE BEFORE AND AFTER TREATMENT WITH RESERPINE

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PARENTERAL administration of the ganglion-blocking agents hexamethonium and pentamethonium to hypertensive patients reduces the glomerular filtration-rate, the renal plasma flow, and the excretion of water and sodium. The renal vascular resistance tends, as a rule, to increase, but it may decrease during the peak action of the drug as judged by the arterial blood-pressure (McQueen 1952, Mackinnon 1952, Mills and Moyer 1953, Freis et al. 1953).

In the work reported here these findings were confirmed and the effect of preliminary treatment with another hypotensive agent, reserpine ('Serpasil'), on the changes induced by hexamethonium were investigated.

Material and Methods

Thirteen patients with sustained hypertension were studied. Nine were women and four were men, their ages ranging from 24 to 72. One patient had chronic bilateral pyelonephritis (case 6), one had chronic unilateral pyelonephritis (case 3), and in one hypertension was first observed during a pregnancy (case 13). The remainder were considered to be cases of essential hypertension of varying severity, with case 7 presenting in the malignant phase of the disease.

To attain as basal states as possible the patient had an initial rest period of 2 weeks in hospital, without treatment, before each test. (In the patient with malignant hypertension the period of observation was only 6 days, because her condition was deteriorating). All the tests were made at the same time of day, about 3 hours after a light breakfast. Water, 1000 ml., was given in the 45 minutes before the start of each test. All the measurements were made with the patient recumbent. The glomerular filtration-rate (G.F.R.) and renal plasma flow (R.P.F.) were measured by the clearance rates of inulin and *p*-aminohippurate respectively, the plasma levels of these substances being kept constant by a continuous intravenous infusion. After 45 minutes allowed for equilibration, urine was collected in three periods, each of about 15 minutes, the bladder being emptied by washing with distilled water and air and by suprapubic compression. During this time the blood-pressure in the arm was measured by auscultation every few minutes, and the pulse-rate was recorded. After these control observations hexamethonium bromide 5–45 mg. was injected via the infusion tubing, and observations were continued during three further periods

TABLE I—EFFECTS OF INTRAVENOUS HEXAMETHONIUM BROMIDE ON RENAL FUNCTION

Case no.	Sex	Age (yr.)	Period	Blood-pressure (mm. Hg)	Pulse-rate	Glomerular filtration-rate (ml. per min.)	Renal plasma flow (ml. per min.)	Filtration fraction	Renal vascular resistance	Urinary excretion (m.eq. per min.)		Urine flow (ml. per min.)
										Sodium	Potassium	
1	F	40	C	233/136	91	106	382	0·28	0·20	0·64	0·10	9·6
			D	177/107	94	45	165	0·27	0·36	0·28	0·04	2·2
			E	127/92	96	61	346	0·18	0·14	0·02	0·07	0·6
			F	134/95	97	70	366	0·19	0·12	0·01	0·13	0·6
2	M	41	C	165/116	71	95	375	0·25	0·17	0·38	0·06	3·9
			D	113/83	83	43	167	0·26	0·27	0·12	0·03	1·6
			E	109/85	87	104	541	0·19	0·08	0·05	0·08	0·6
			F	127/94	89	92	402	0·23	0·12	0·05	0·13	0·5
3	F	30	C	176/119	73	77	362	0·21	0·23	0·27	0·06	5·1
			D	168/118	90	63	296	0·21	0·27	0·21	0·05	2·6
			E	161/114	94	53	237	0·22	0·33	0·15	0·04	1·5
			F	165/116	93	68	341	0·20	0·23	0·21	0·06	1·8
4	F	37	C	158/111	80	100	366	0·27	0·19	0·18	0·04	3·1
			D	153/109	86	68	231	0·29	0·30	0·13	0·03	0·8
			E	141/105	93	77	270	0·28	0·24	0·12	0·03	0·5
			F	158/114	92	78	280	0·28	0·24	0·09	0·02	0·6
5	M	72	C	247/113	65	73	270	0·27	0·31	1·08	0·12	10·2
			D	205/100	67	52	158	0·33	0·44	0·43	0·08	3·5
			E	199/104	68	62	239	0·26	0·30	0·37	0·10	2·7
			F	231/111	69	78	266	0·29	0·30	..	..	4·9
6	M	38	C	145/102	64	36	168	0·21	0·40	0·20	0·07	3·1
			D	146/104	74	39	160	0·24	0·42	0·16	0·07	2·1
			E	150/105	79	39	149	0·26	0·46	0·13	0·05	1·5
			F	149/107	72	35	155	0·23	0·45	0·14	0·06	1·5
7	F	56	C	251/153	72	38	124	0·31	0·87	0·23	0·04	3·0
			D	189/128	76	19	69	0·27	1·32	0·10	0·02	0·9
			E	171/123	75	20	84	0·24	0·94	0·01	0·01	0·1
			F	191/133	75	28	121	0·23	0·73	0·01	0·03	0·3
8	F	31	C	177/127	73	90	265	0·34	0·22	0·27	0·05	6·0
			D	171/123	91	62	198	0·31	0·42	0·13	0·04	1·7
			E	167/121	94	89	302	0·29	0·27	0·20	0·04	1·4
			F	175/131	96	89	306	0·29	0·23	0·23	0·05	1·1
9	M	24	C	225/140	75	57	276	0·21	0·31	0·42	0·12	6·3
			D	215/132	82	44	215	0·21	0·38	0·20	0·06	3·2
			E	211/127	93	50	199	0·25	0·40	0·13	0·07	1·1
			F	211/131	95	52	214	0·24	0·38	0·12	0·07	1·0
10	F	59	C	221/112	71	99	400	0·25	0·20	0·32	0·12	7·9
			D	213/111	71	78	318	0·25	0·24	0·22	0·10	4·5
			E	208/111	63	60	269	0·22	0·28	0·14	0·07	1·9
			F	218/113	64	89	405	0·22	0·20	0·27	0·12	2·3
11	F	55	C	222/111	85	81	317	0·25	0·25	0·15	0·05	2·7
			D	130/73	81	39	158	0·25	0·31	0·04	0·02	0·7
			E	135/78	76	8	30	0·27	1·73	0·01	0·01	0·2
			F	147/80	76	20	125	0·16	0·44	0·01	0·01	0·1
12	F	58	C	218/119	60	74	293	0·25	0·28	0·69	0·08	8·2
			D	143/91	63	19	78	0·24	0·76	0·18	0·02	0·8
			E	126/85	58	22	132	0·17	0·41	0·06	0·02	0·6
			F	129/85	58	29	194	0·15	0·28	0·02	0·03	0·2
13	F	45	C	204/124	78	47	185	0·25	0·49	0·14	0·07	3·6
			D	179/118	90	40	164	0·24	0·50	0·10	0·05	2·0
			E	180/118	91	39	173	0·22	0·48	0·03	0·04	0·6
			F	187/123	88	52	233	0·22	0·37	0·06	0·07	0·9

C, control, average of three periods of about 15 min. each.
D, E, F, three consecutive periods of about 15 min. each after injection of hexamethonium.

TABLE II—EFFECTS OF INTRAVENOUS HEXAMETHONIUM BROMIDE ON RENAL FUNCTION IN HYPERTENSIVES UNDER TREATMENT WITH RESERPINE

Case no.	Sex	Age (yr.)	Period	Blood-pressure (mm. Hg)	Pulse-rate	Glomerular filtration-rate (ml. per min.)	Renal plasma flow (ml. per min.)	Filtration fraction	Renal vascular resistance	Urinary excretion (m.eq. per min.)		Urine flow (ml. per min.)
										Sodium	Potassium	
9	M	24	C	195/127	71	61	265	0·23	0·30	0·18	0·12	4·6
			D	194/120	70	51	242	0·21	0·32	0·14	0·11	2·2
			E	178/119	72	56	203	0·28	0·37	0·10	0·12	2·7
			F	174/117	73	58	222	0·26	0·33	0·12	0·13	1·9
10	F	59	C	233/111	54	102	404	0·25	0·20	0·40	0·15	9·1
			D	201/202	56	80	364	0·22	0·19	0·23	0·12	3·2
			E	211/103	55	66	290	0·23	0·25	0·17	0·09	1·1
			F	214/109	53	79	456	0·17	0·16	0·31	0·15	1·8
11	F	56	C	210/96	63	80	322	0·25	0·24	0·18	0·09	5·5
			D	144/77	69	28	141	0·20	0·40	0·02	0·03	0·5
			E	136/75	65	30	181	0·17	0·30	0·02	0·02	0·2
			F	143/77	65	33	227	0·14	0·25	0·00	0·03	0·1
12	F	58	C	188/101	56	76	297	0·26	0·25	0·56	0·08	6·6
			D	156/90	62	35	132	0·26	0·48	0·22	0·04	2·1
			E	146/85	54	55	257	0·21	0·23	0·14	0·06	0·8
			F	149/88	54	61	262	0·23	0·22	0·19	0·08	1·3
13	F	45	C	184/110	66	53	199	0·27	0·41	0·14	0·09	8·4
			D	161/103	70	48	194	0·25	0·38	0·10	0·07	6·3
			E	162/105	71	48	180	0·27	0·41	0·10	0·06	7·1
			F	166/108	68	46	206	0·22	0·37	0·11	0·07	5·8

C, D, E, F, as in table I.

of about 15 minutes each. An attempt was made to estimate by a previous test dose the amount of hexamethonium necessary to produce a moderate fall in blood-pressure in each patient.

Inulin in the plasma and urine was measured by the method of Roe et al. (1949), and *p*-aminohippurate by the method of Smith et al. (1945). Urinary sodium and potassium concentrations were determined by flame photometry. The mean arterial blood-pressure (M.B.P.) was estimated as one-third of the pulse pressure plus the diastolic pressure, and the renal blood-flow (R.B.F.) was calculated as $\frac{\text{Renal plasma flow}}{\text{1-Hæmatocrit}}$.

The renal vascular resistance (R.V.R.) was expressed as units of $\frac{\text{M.B.P.}}{\text{R.B.F.}}$. The G.F.R., R.P.F., and R.V.R. were corrected for a body-surface area of 1·73 sq. m.

In five of the thirteen patients (cases 9–13) the above-mentioned procedure was repeated after 2 weeks during which oral reserpine 0·5 mg. t.i.d. was given. The dose of hexamethonium administered to each patient on the second occasion was the same as that given during the first test.

Results

The results in the thirteen patients after the injection of hexamethonium are shown in table I. Table II shows the effects of hexamethonium in the five patients during treatment with reserpine. Fig. 1 illustrates the changes induced by hexamethonium in the thirteen patients, and fig. 2 the changes induced by hexamethonium in one patient before and during treatment with reserpine.

The average blood-pressure was 203/122 mm. Hg before the injection of hexamethonium. After injection the pressure fell in most cases to an average of 160/105. There were, however, considerable individual differences in the response to hexamethonium, the blood-pressure sometimes remaining unchanged and sometimes falling precipitately with symptoms of hypotension. The average pulse-rate rose after injection of hexamethonium, but in some patients either no change or a decrease was observed.

Both the G.F.R. and R.P.F. usually decreased after the injection of hexamethonium. In patients in whom the blood-pressure fell considerably a substantial decrease in the G.F.R. and R.P.F. was usually seen. However, even when the blood-pressure was only slightly decreased, considerable alterations in the G.F.R. and R.P.F. were observed in some patients. The greatest change seen was immediately after injection. Towards the end of the observation periods both the G.F.R. and R.P.F. tended to rise—the R.P.F. more rapidly than the G.F.R. This was reflected in the filtration fraction which tended to decrease during the period of recovery of G.F.R. and R.P.F.

After the injection of hexamethonium the average R.V.R. rose initially but it diminished towards the end of the period of observation. In some patients the more rapid recovery of the R.P.F. following the initial decrease resulted in the R.V.R. falling below control levels, while the blood-pressure remained low; in others recovery was less rapid and the R.V.R. remained high.

After injection of hexamethonium the average rate of urine flow fell progressively from the control levels, a greater fall being observed when the blood-pressure fell considerably. At the same time the excretion of urinary sodium decreased, tending to parallel the rate of the urine flow. The urinary excretion of potassium decreased immediately after injection but increased towards control values at the end of observation.

In the five patients treated with reserpine the average blood-pressure before treatment was 218/121 mm. Hg and during treatment 202/109. The pulse-rates were slower during treatment with reserpine, being 74 before treatment and 62 after treatment. No great differences were noted in the G.F.R., R.P.F., or filtration fractions before or during treatment. The R.V.R. averaged 0·305 before treatment and 0·278 during treatment with reserpine, reflecting the slight fall in the arterial blood-pressure.

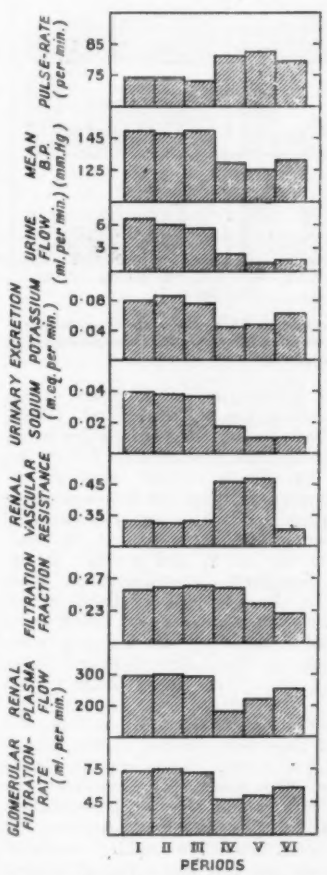

Fig. 1—Changes induced by intravenous injection of hexamethonium bromide in 13 hypertensives. Values are means of 13 patients. Periods I–III are control observations and periods IV–VI those after injection.

After the injection of hexamethonium in these five patients the alterations in renal hæmodynamics and in the excretion of water and electrolytes resembled those observed before treatment with reserpine. Quantitative differences were, however, noted in some patients.

Discussion

These results confirm the observations that the injection of hexamethonium in hypertensive people tempor-

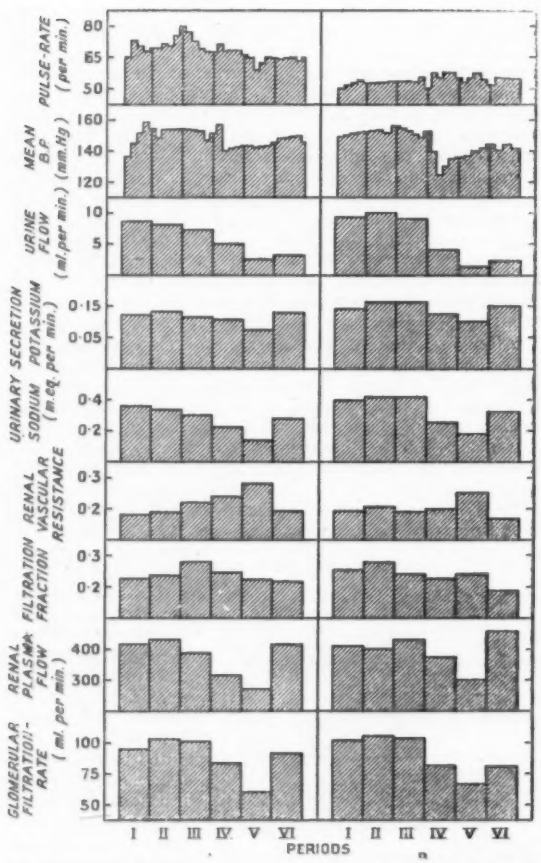

Fig. 2—Case 10: effect of intravenous hexamethonium bromide before (A) and during (B) treatment with reserpine. Hexamethonium injected at beginning of period IV.

arily alters the renal hæmodynamics and the excretion of water and electrolytes. Freis et al. (1953) did not observe alterations in the renal circulation when the injection of hexamethonium produced no fall in the blood-pressure; but Mackinnon (1952), using pentamethonium, noted changes even when the blood-pressure did not fall. In the present series minor alterations in blood-pressure were sometimes accompanied by considerable alterations in the R.P.F. and G.F.R. Hexamethonium causes peripheral vasodilatation with increased blood-flow to the extremities (Freis et al. 1953); this may lead to the borrowing of blood from other parts of the body, including the kidneys, with a consequent reduction in blood-flow through these structures without any change in the systemic blood-pressure.

Hexamethonium may either increase or decrease the R.V.R. at the height of its action, judged by the blood-pressure (Mills and Moyer 1953). Both responses were observed in this series. The result may depend on the ability and rapidity with which the renal circulation adjusts itself to sudden changes in blood-pressure. In patients in whom the renal blood-flow rapidly recovered while the blood-pressure was low the R.V.R. decreased below control values. When the R.B.F. recovered more slowly while the blood-pressure was rising, the R.V.R. was increased at the time of the peak action of the hexamethonium. In the two patients in whom the R.V.R. was decreased renal function was good, judged by ordinary clinical tests. In all the patients with impaired renal function R.V.R. increased. The severity of the disease, as it affects the renal vasculature, may determine the type of response.

Mills and Moyer (1953) suggested that the increase in R.V.R. may be explained on the basis of reflex vasoconstriction in response to the fall in blood-pressure, and that this is mediated via the sympathetic nervous system through incompletely blocked ganglia. On the other hand, the R.V.R. is expressed as the ratio of the M.B.P. to R.B.F., and the vasoconstriction inferred from this measurement may be the result of a shift of blood away from the renal circulation, together with a decrease in both the cardiac output (Werkö et al. 1951, Freis et al. 1953) and the blood-pressure, and consequent arteriolar constriction.

The effect of reserpine may take days or weeks to become apparent. In this series 2 weeks' treatment was allowed before the second test, and a decrease in the pulse-rate was taken to indicate that the reserpine was acting. Moyer (1954) found no effect on the G.F.R. and R.P.F. in eight hypertensives during treatment with oral reserpine for 3 or more months. In the five patients studied in this series the levels of G.F.R. and R.P.F. were similar before and after 2 weeks' treatment with reserpine. The R.V.R. was slightly less during treatment with hexamethonium in four of these patients owing to a slight fall in the blood-pressure. The pattern of response to hexamethonium before and during treatment did not differ. Quantitative differences, however, were observed in some patients. Case 11 developed hypotensive symptoms during the first examination, and the alterations in the renal circulation were more pronounced during this test than on the second occasion. On the afternoon after the first examination the patient became pyrexial owing to an infection in a submaxillary salivary gland from an impacted calculus. This could explain the differences observed. It was found also that the effect of equal doses of hexamethonium in the same patient varied at different times. Sometimes a test dose which had produced considerable changes in the blood-pressure caused only a slight effect during the investigation. Sometimes the opposite happened. Familiarity with the procedure and small differences in technique may have affected the state of the patients and could explain the variations found. These factors must be considered in interpreting the results.

Parenteral hexamethonium decreases the rate of urine flow and the excretion of urinary sodium. Though the fall in G.F.R. may explain this in part, the fact that it persisted even when the G.F.R. was again rising suggests increased tubular reabsorption of water and sodium as another factor. The mechanism of this retention of sodium and water is unknown. Preliminary treatment with reserpine did not alter the pattern of response as regards the rate of urine flow and the excretion of sodium and potassium except in one case in which no obvious reason for the difference was apparent.

Summary

In thirteen patients with hypertension the effects of intravenous hexamethonium on the renal circulation and on the excretion of water and electrolytes were studied, and in five of these patients examinations were repeated under treatment with reserpine.

The effects of hexamethonium on renal hæmodynamics have been confirmed—namely, temporary decreases in glomerular filtration-rate and renal plasma flow, usually an increase in renal vascular resistance, and a decrease in the rate of urine flow and in urinary excretion of sodium.

Preliminary treatment with reserpine did not affect the changes produced by intravenous hexamethonium on the renal circulation.

I am indebted to the medical committee of the Institute of Clinical Research, the Middlesex Hospital, for providing the facilities for this work. In particular I thank Dr. A. Willcox, in whose unit it was done, for his constant encouragement and advice, and Prof. A. Kekwick, director of the institute.

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RENAL HÆMODYNAMIC EFFECTS OF HYPOTENSIVE DRUGS

II. EFFECTS OF ORAL MAINTENANCE THERAPY WITH PENTAPYRROLIDINIUM BITARTRATE AND RESERPINE

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IN most hypertensive patients the systemic blood-pressure is lowered by adequate therapy with hypotensive drugs, and in some of them there is clinical evidence of arrest or regression of vascular disease. The fall in blood-pressure must be accompanied by either a decrease in the total peripheral resistance or a fall in cardiac output, or both. Such a readjustment of the circulation may lead to inadequate blood-flow through the essential circulations of the kidney, heart, or brain.

The present study was designed to measure any change in the renal hæmodynamic pattern of patients with severe hypertension in whom a satisfactory clinical response to hypotensive therapy had been obtained. The renal and vascular effects of continuous oral hypotensive therapy with reserpine ('Serpasil') and the ganglion-blocking agent pentapyrrolidinium bitartrate ('Ansolysen') are reported. Parenteral administration of another ganglion-blocking agent (hexamethonium bromide) causes a striking temporary alteration in the renal hæmodynamic pattern, which is unaltered by previously administered reserpine (Goldberg 1957).

Material and Methods

Of a larger series of patients receiving hypotensive therapy for severe sustained systemic hypertension, six were studied (four women and two men, aged 52–62). Case 7 had malignant hypertension; the remainder had severe hypertension, which was considered to be essential and which was associated with impairment of cardiac, renal, and retinal function in varying degrees in the different patients, none of whom was in cardiac failure at the time of study. In all the patients the systolic blood-pressure before treatment was at least 210 mm. Hg, and the diastolic at least 110 mm.

The patients were admitted to hospital for an initial period of rest, during which no specific hypotensive therapy was given, and were observed until their blood-pressures became stable. Renal plasma flows and glomerular filtration-rates were respectively measured by the *p*-aminohippurate and inulin methods, as previously described (Goldberg 1957). The results reported are the averages of three periods each of about 15 minutes. Hæmatocrits were recorded, and the renal blood-flow, filtration fraction, and renal vascular resistance calculated. Cardiac outputs were determined by a dye-dilution method using 'T. 1824' and a photo-electric ear densitometer (Milnor et al. 1953). All measurements were made with the patients recumbent.

Hypotensive therapy with reserpine and pentapyrrolidinium was then started. When a satisfactory sustained therapeutic effect had been obtained, and an adequate maintenance dose of the drugs established, the above tests were repeated. The dose of pentapyrrolidinium varied in different patients, and the second examination was made after periods of treatment varying from 17 to 80 days; these were kept as short as possible, so that progressive deterioration of renal function, due to the disease itself, would be unlikely to affect the results.

Results

The results are shown in the accompanying table.

Blood-pressure and Pulse-rate.—The blood-pressure was lowered before and during the second study in all but one patient (case 18), in whom the pressure was temporarily raised to former levels at the actual time of the second study, although before it there had been good control. In all patients except one (case 7) the pulse-rate was slower after treatment than before.

Glomerular Filtration-rate (G.F.R.).—The average G.F.R. in the six patients was 70 ml. per minute before treatment and 64 ml. during treatment. There was no marked change in G.F.R. in any patient; in the five patients in whom the blood-pressure was reduced at the time of the second study the G.F.R. was slightly lower than before, and in the remaining patient (case 18) it was slightly higher.

Renal Plasma Flow (R.P.F.).—There was no significant change in R.P.F. in the six patients before and during treatment; the average was 254 ml. per minute before treatment and 256 ml. during treatment.

Filtration Fraction (F.F.).—The average F.F. in the six patients was 0·279 before treatment and 0·255 during treatment. The slight decrease reflected the lower G.F.R. which usually occurred with treatment.

Renal Vascular Resistance (R.V.R.).—In the six patients the R.V.R. averaged 0·400 before treatment and 0·309

EFFECTS OF MAINTENANCE TREATMENT WITH PENTAPYRROLIDINIUM BITARTRATE AND RESERPINE ON RENAL FUNCTION IN HYPERTENSIVE PATIENTS

Case no.	Sex	Age (yr.)	Period	B.P.	G.F.R.	R.P.F.	F.F.	R.V.R.
14	F	61	A	225/120	83	329	0·252	0·254
			B	206/99	75	335	0·224	0·224
15	M	62	A	257/129	64	290	0·211	0·307
			B	155/81	59	303	0·195	0·109
16	F	60	A	214/128	81	271	0·299	0·326
			B	163/111	73	275	0·266	0·276
17	F	52	A	210/137	94	234	0·401	0·364
			B	171/117	80	248	0·323	0·307
7	F	56	A	251/153	38	124	0·306	0·881
			B	205/117	35	143	0·241	0·633
18	M	56	A	210/110	57	276	0·206	0·267
			B	199/107	64	230	0·278	0·304

A, before treatment.
B, after treatment.
B.P., blood-pressure in mm. Hg. The figures are averages for numerous observations at the time of each study
G.F.R., glomerular filtration-rate (ml. per min.)
R.P.F., renal plasma flow (ml. per min.).
F.F., filtration fraction.
R.V.R., renal vascular resistance.

during treatment. The decrease was due to the fall of blood-pressure.

Cardiac Output.—No uniform response as regards cardiac output was found in this small number of patients. Some showed an increase in cardiac output and others a decrease.

Discussion

The effects on renal function of a combination of drugs, the ganglion-blocking agent pentapyrrolidinium bitartrate and reserpine, commonly used in hypotensive therapy, have been studied. No marked alteration in the renal hæmodynamic pattern was found with maintenance oral therapy except a decrease of the R.V.R. Ford et al. (1953) observed the effects of maintenance therapy with oral hexamethonium in 13 hypertensive patients. In the recumbent position no marked alterations in the G.F.R. and R.P.F. were observed, although there was a significant fall of the blood-pressure and a decreased R.V.R. In 7 of their patients the effects of ambulation were studied before and during treatment; the postural reduction in G.F.R. and R.P.F. was somewhat greater during treatment than before.

Oral reserpine was similarly found to produce no significant change in R.P.F. (Moyer 1954, Andreæ and Smith 1955). In the present study the combination of reserpine with another ganglion-blocking agent, pentapyrrolidinium, likewise did not alter the R.P.F., at least in the recumbent position. The findings during treatment were similar to those found during the recovery phase following the injection of hexamethonium, with or without the previous administration of reserpine (Goldberg 1957). The renal circulation apparently adapts to the decrease in blood-pressure following maintained oral therapy with pentapyrrolidinium and reserpine, and maintains the renal blood-flow.

In the five patients in whom the blood-pressure was lower during the second study the G.F.R. was then slightly less than before, and the F.F. was reduced. During severe hypotensive episodes which can occur during treatment a more profound alteration in the renal hæmodynamic pattern is possible, but probably temporary. Although the decrease in G.F.R. was consistent, it is unlikely to be materially significant in these patients, because no evidence of progressive reduction in renal function was found with continued treatment. Reduction in renal function, as judged by simple clinical tests, was exceptional in other patients who were treated with this combination of drugs and observed over long periods by one of us (L. McD. 1954, unpublished). When renal function did progressively deteriorate, there was evidence of critically impaired function before the start of treatment. A small absolute decrease in the G.F.R. in these patients could represent a considerable proportional reduction and be sufficient to aggravate existing renal insufficiency. In this regard it was found that further deterioration tended to occur early in treatment, and was made manifest by a rising level of blood-urea (McDonald 1954 unpublished, Stover et al. 1956). If this form of therapy is still indicated in patients with critically impaired renal function, it is our practice repeatedly to determine the level of the blood-urea, particularly during the early stages of treatment.

Hexamethonium given intravenously to hypertensive patients has been found to decrease cardiac output (Werkö et al. 1951, Freis et al. 1953), to increase it in the presence of heart-failure (Freis et al. 1953), and to cause no significant change in cardiac output (Gilmore et al. 1952). The present findings are inconclusive as regards the effect of oral pentapyrrolidinium and reserpine on cardiac output. The changes observed differed in individual patients and, in view of the error of the method, were of doubtful significance.

During hypotensive therapy the possibility of interference with essential circulations exists. It is concluded that optimal lowering of blood-pressure, which is a criterion of successful hypotensive therapy, appears rarely to interfere significantly with renal function, and that simple clinical tests of renal function should detect such interference. No evidence was found, in this small series, of a diminution in renal blood-flow or of relative renal ischæmia, which might mitigate the advantages of hypotensive therapy.

Summary

Renal plasma flow, glomerular filtration-rate, filtration fraction, renal vascular resistance, and cardiac output were measured in six patients with severe hypertension, before and during treatment with oral pentapyrrolidinium bitartrate and reserpine.

Little alteration in the renal hæmodynamic pattern was observed, apart from a lowering of the renal vascular resistance.

In patients in whom the blood-pressure fell, the glomerular filtration-rate and the filtration fraction were slightly reduced. This is usually not of clinical significance, except in patients with critical impairment of renal function before treatment; further deterioration may then occur during treatment.

Of the simple clinical tests of renal function, the blood-urea level especially appears to be a good guide to the progress and management of such cases.

It is a pleasure to thank Prof. Alan Kekwick, director of the Institute of Clinical Research, Middlesex Hospital, for encouragement and facilities for this work; the clinical research committee of the Institute for a grant to one of us (L. McD.); Dr. T. M. Chalmers for helpful comment; and Dr. Evan Bedford, Dr. Walter Somerville, and Dr. Arthur Willcox for encouragement and allowing us to study patients under their care.

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HYPERCALCÆMIA IN ACUTE LEUKÆMIA

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THE association of acute leukæmia and hypercalcæmia is rare and justifies record of the following case, in which many of the clinical features were attributable to the raised serum-calcium level.

Case-report

In March, 1956, a soldier, aged 20, serving in Kenya, fell from a lorry and struck the left side of his chest. For the next two weeks he had pain in the left lower chest, aggravated by movement and inspiration. At the end of March he lost his appetite. He was awakened on April 2 by epigastric pain and nausea, followed by repeated vomiting, which continued until admission to hospital in Nairobi two days later.

On admission epigastric tenderness, a temperature of 101°F, and injection of his conjunctivæ were the only abnormal physical signs found. Radiography of his chest showed callus formed round the 7th left rib posteriorly. Examination of his blood showed hæmoglobin 80% (11·8 g. per 100 ml.), white cells 8000 per c.mm. (neutrophils 31%, lymphocytes 59%, monocytes 1%, eosinophils 9%), and erythrocyte-sedimentation rate 40 mm. in the first hour (Wintrobe). A Mantoux test was positive 1/100. Widal agglutinations and

culture of the blood were normal. Routine testing and microscopy of the urine showed no abnormality.

Progress

During the ensuing weeks the abdominal discomfort improved but the anorexia and vomiting continued. The patient's temperature was often raised (99–102°F) in the evenings, and on April 16 he complained of aching pains in both hips and both knees.

On May 22 evidence of renal damage was found: the blood-urea level was 80 mg. per 100 ml.; and the highest specific gravity of the urine was 1·012; and the urine often contained red and white cells and hyaline and granular casts. Intravenous pyelography did not outline the kidneys. Radiography showed rarefaction of the pelvic bones and femoral heads. The hæmoglobin had decreased to 52% (7·7 g. per 100 ml.). The patient was given a blood-transfusion and flown home to hospital in England on May 26.

Severe anorexia and vomiting, four or five times daily, continued; he complained of thirst and was passing an abnormally large volume of urine. His obvious loss of weight, pallor, and injected conjunctivæ were the only abnormalities found on physical examination. No enlargement of lymph-nodes, liver, or spleen was detected. Eye changes were a feature throughout the illness: leashes of injected vessels ran from the cornea to the canthi; near the limbus, along the course of these vessels, were several small yellowish plaques which did not stain with fluorescein, but otherwise the picture was similar to phlyctenular conjunctivitis.

Further investigations showed Hb 62% (9·3 g. per 100 ml.); white cells 2500 per c.mm. (neutrophils 11%, lymphoctyes 63%, monocytes 5%, myelocytes 1%, primitive cells of uncertain type 20%); platelets 45,000 per c.mm. An occasional normoblast was present. A similar blood picture was found on repeated examinations over a period of weeks. Bone-marrow was difficult to obtain, aspiration being attempted from several sites, but satisfactory smears were made which showed sheets of primitive cells of lymphoid type. Repeated examinations of the serum-proteins, including paper electrophoresis, showed no abnormality, nor was Bence-Jones protein ever demonstrated in the urine. The serum-calcium level was consistently raised on many estimations, being 17–24 mg. per 100 ml. The levels of inorganic phosphate and alkaline phosphatase in the serum were always within normal limits. The blood-urea level was raised, being 57–74 mg. per 100 ml. The daily output of urine was about 3 litres, of sp. gr. 1·010. Albumin, cells, and casts were constant findings. The urinary excretion of calcium was 560 mg. daily and of phosphate 1·2 g. daily. Radiography showed widespread skeletal rarefaction, especially in the pelvis and femoral heads.

Treatment

On June 15 the hæmoglobin had decreased to 36% (5·3 g. per 100 ml.), and the patient was started on a course of cortisone 300 mg. daily and given repeated blood-transfusions. During the next few weeks he improved steadily. His appetite recovered, vomiting ceased, and he gained weight and was able to get out of bed. The biochemical picture also changed. The serum-calcium was within normal limits on several occasions. The level of alkaline phosphatase in the serum rose to 21 K.-A. units, and the excretion of calcium and phosphate, although still abundant, became much less. The hæmoglobin increased to 13 g. per 100 ml., but the white cells were still only 1500–2000 per c.mm., and "blasts" were still present in the blood-film. Platelets remained constant at about 40,000 per c.mm. There was no radiologically demonstrable change in the bones.

Death

Towards the end of July the patient began to vomit again and to complain of anorexia and headache. His hæmoglobin, despite transfusions, decreased steadily, and the serum-calcium level was again high—15–16 mg. per 100 ml. On Aug. 8 he developed widespread purpura, vomited blood, and, after three epileptic fits, became comatose and died.

Necropsy Findings

Fourteen hours after death there were numerous petechial hæmorrhages in the skin and pericardium.

Reticulo-endothelial system.—The bone-marrow of the sternum, femora, vertebræ, and ilium was replaced by red gelatinous material interspersed with many yellow areas. Microscopically the marrow showed replacement of normal hæmopoietic tissue by sheets of large immature round cells of uniform size with little cytoplasm and vesicular nuclei containing a nucleolus; these cells corresponded to the lymphoblasts seen in the marrow smears. Lymph-nodes in the para-aortic, mesenteric, and axillary groups were moderately enlarged, up to 2 cm. in diameter, and their cut surfaces appeared uniformly pink; microscopically the normal architecture was lost, with an increase of large lymphoblasts. Subcapsular and medullary sinuses were dilated and contained many large macrophages. The spleen (440 g.) had a normal cut surface and microscopical architecture but contained much iron pigment. The liver (2060 g.) had a normal cut surface, and microscopically showed infiltration of large lymphocytes in the portal tracts.

Urogenital system.—The kidneys (right 200 g., left 220 g.) showed pale cut surfaces with a narrow cortex; wedge-shaped nodules of infiltration involved both cortex and medulla. Microscopically the nodules consisted of large uniform round cells similar to those seen in the marrow; there were numerous deposits of calcium in the cortex and medulla, but the glomeruli showed little change.

Endocrine system.—The parathyroid glands were of normal size and structure.

The brain showed focal cortical hæmorrhages, especially in the frontal and temporal cerebral lobes.

Discussion

This case of acute lymphoblastic leukæmia of the "aleukæmic" type presented unusual features. Rarefaction of bones and severe hypercalcæmia, accompanied by anorexia, abdominal pain, and vomiting, with polydipsia and polyuria, may occur in hyperparathyroidism (Snapper 1952). Sarcoidosis too may present with similar clinical features and a high serum-calcium level (Dent et al. 1953, McSwiney and Mills 1956). Myers (1956), reviewing 61 cases with hypercalcæmia, noted 1 case of acute leukæmia with a serum-calcium level of 11·8 mg. per 100 ml., and in a case of lymphosarcoma he found a serum-calcium level of 20·4 mg. per 100 ml. We have found no other record of hypercalcæmia in leukæmia nor any description of leukæmia presenting a clinical picture like that in the present case.

Leukæmia has long been known to cause bony abnormalities. Erb (1934) described rarefaction as one of the changes in the bones of children with acute leukæmia. Kalayjian et al. (1946) reviewed 144 cases of leukæmia with radiological evidence of bone involvement and found that 96% were of lymphoid type. In a recent survey Griffiths (1955) has emphasised the association of bone changes with the "aleukæmic" forms of acute leukæmia in children.

Hypercalcæmia, usually of moderate degree, may occur in any case of neoplastic invasion of bone—e.g., by metastatic carcinoma and by myeloma. Absence of new bone formation and the consequent normal level of alkaline phosphatase in the serum are features of myelomatous invasion (Snapper 1952).

In the absence of any detectable change in the serum-proteins we considered two possible explanations of the high blood-calcium level and rarefaction of the bones in the present case: hyperparathyroidism and invasion of bone by leukæmic tissue. The remote possibility of a coincidental primary hyperparathyroidism was considered, but the alkaline-phosphatase level was normal and at necropsy the parathyroid glands were normal. There was considerable damage to the kidneys in the present case from leukæmic infiltration of the kidneys and, later, presumably from nephrocalcinosis. Parathyroid overactivity secondary to renal failure may give rise to hypercalcæmia, but in the present case the normal alkaline-phosphatase level and the lowered serum-calcium level after treatment with cortisone are points against this explanation.

We suggest that the likely cause of the hypercalcæmia was continued and widespread leukæmic invasion of bones. Temporary remissions of acute lymphoblastic leukæmia after cortisone therapy are known (Wilkinson 1953). Such a remission took place in the present case and was reflected by a fall in the serum-calcium level and a rise in the serum-alkaline-phosphatase level,

presumably owing to cessation of bone destruction with some attempt at new bone formation. A similar sequence of events occurred in a case of lymphosarcoma treated with nitrogen mustard and cortisone (Myers 1956) and in cases of sarcoidosis treated with cortisone (Dent et al. 1953). Some regression in the bony changes, shown radiologically, was noted by Dresner (1950) after the treatment of cases of acute leukæmia with aminopterin.

The chronic symptomless conjunctivitis was an interesting feature for which we can offer no satisfactory explanation, post-mortem section of the eyes not being permitted. Leukæmic deposits in the conjunctivæ have been described (Wintrobe and Mitchell 1940), but the descriptions do not seem to fit the changes in the present cases.

Summary

In a case of acute lymphoblastic leukæmia, hypercalcæmia was probably due to invasion of bones by leukæmic tissue.

We are grateful to Lieut.-Colonel J. A. G. Carmichael, R.A.M.C., physician in charge of the patient, and Lieut.-Colonel P. D. Stewart, R.A.M.C., for advice, and the technical staff of Eastern Command laboratory for help with the investigations.

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Preliminary Communication

ALLOXAN AS A POSSIBLE THERAPEUTIC AGENT FOR PRIMARY CARCINOMA OF THE LIVER

With illustrations on plate

THE relationship of endocrine action to the genesis and therapy of advanced cancer has received considerable attention in recent years, and especially during the past year.[1 2] This approach may yet prove of value in elucidating host-tumour relations and tumorigenesis.

In the experimental field there is evidence that the production of alloxan diabetes in rats almost entirely prevents the induction of hepatomas by feeding azo-dyes,[3] and inhibits tumour growth or reduces the mortality-rate in rats receiving implants of carcinoma (but not sarcoma).[4] More recently Ingle [5] has reported that diabetes induced in rats by partial pancreatectomy suppressed tumour growth.

Hepatocellular carcinoma in man is invariably fatal, usually 4–6 weeks after clinical diagnosis.[6] No form of therapy has hitherto been found to be of any value, even in prolonging life.

Bearing all these experimental and clinical data in mind, and despite the fact that alloxan had not, to our knowledge, previously been given to man, we considered it worth while to study the effects of alloxan on patients with primary hepatic carcinoma. Diabetes, if induced, would be controllable with insulin.

CLINICAL TRIAL

The preliminary results in three hopelessly advanced cases (for example, see fig. 1), and one with a slowly growing tumour, studied over the past year, are reported here. The diagnosis of primary hepatic carcinoma was proved in all four cases by needle biopsy of the liver.

Fig. 1—Case 1 immediately after paracentesis, showing bulging nodular liver.

Alloxan 70–150 mg. per kg. body-weight was administered intravenously, over a period not exceeding one minute, as a fresh 20% solution of alloxan monohydrate in distilled water. These doses are known to be diabetogenic for most animals. There was no significant untoward reaction to any of the seven injections given to our patients.

Cases 1 and 2, African males aged 48 and 40, with typical, rapidly growing, and metastasising cancers, each received two injections of alloxan (case 1 at 16-day and case 2 at 58-day intervals), and lived for 18 and 103 days, respectively, after the first injection. Case 3, an African male aged 56, was moribund before receiving a single alloxan injection. He died within a few days, no post-mortem being obtained; death could not be attributed to the treatment. Case 4, an African female aged 28, with a slowly growing cholangiocellular carcinoma, has had two injections of alloxan and is still in hospital with no deterioration in her clinical condition.

After the first alloxan injection case 1 experienced dramatic cessation of pain, which did not return. In cases 1, 2, and 4 the liver became slightly but measurably smaller. The fasting blood-sugar levels in cases 1 and 2, initially rather low, showed slight transient rises after alloxan but always remained well within normal limits. Glucose-tolerance tests, before and after alloxanisation in these cases, showed no significant changes. Case 4 had normal resting blood-sugar levels at all times, but her glucose-tolerance tests, before and after alloxan, showed lag storage, which seemed slightly greater on the latter occasion. Assessment of therapy in this case will be difficult because of the longer history and the quite different type of cancer.

Histological study of necropsy material, obtained from cases 1 and 2 only, revealed extensive necrosis of primary and secondary tumours. Unusually marked sclerosis was present both in the primary and in all secondary tumours in case 2 (figs. 2 and 3). Since necrosis of hepatic carcinomas often develops spontaneously,[6] this may not be significant. However, the extent of the necrosis, and, especially of the tumour sclerosis in case 2, may merit special emphasis. Also of interest was the absence of any histological evidence of damage to either pancreatic islets or kidneys in the one case studied.

CONCLUSIONS

We consider the following findings to be of some interest and perhaps attributable to the treatment: (1) the cessation of pain in case 1; (2) the reduction in size of the liver in cases 1, 2, and 4; (3) the extensive sclerosis in both primary and secondary tumours, especially in case 2; particularly (4) the unusually long survival of case 2 (with a rapidly growing hepatocellular

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2. *Lancet*, 1956, i, 676.
3. Salzberg, D. A., Griffin, A. C. *Cancer Res.* 1952, **12**, 294.
4. Goranson, E. S., Botham, F., Willms, M. *Ibid*, 1954, **14**, 730.
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carcinoma) for more than 5 months after the onset of symptoms (Berman [6] found that " . . . the duration [of primary carcinoma of the liver] was never more than 4 months from the first appearance of symptoms "); and (5) the absence of hyperglycæmia and glycosuria after alloxanisation—noteworthy especially because decreased glycosuria has been reported in human diabetics developing certain tumours [7] and in diabetic rats bearing tumour transplants.[8] Moreover, alloxanised rats bearing tumours have lower blood-sugar levels than alloxanised tumour-free controls.[4]

In the light of these findings we consider that the alloxan therapy *may* have had some effects in two of the cases, and *may* perhaps have prolonged the life of case 2.

The primary object of this note is to arouse interest in the possibility of treating with alloxan primary carcinoma of the liver, and possibly advanced carcinomas arising in other sites. Our findings provide some basis for recommending further and more extensive investigation of the significance and interactions of alloxan injections on cancers, as well as of the abnormal carbohydrate metabolism occurring spontaneously in association with cancers.[8] However, at the present time, we do not feel justified in making *any* special claims for this form of treatment.

Since the above was written, three further cases of primary carcinoma of the liver have been given 1 injection each of alloxan (100 mg. per kg. body-weight). On the day following his injection, the third patient developed total anuria lasting 4 days, confirming the potentially nephrotoxic action of alloxan already described in animals.

Our thanks are due to Dr. S. Disler, hospital superintendent, for permission to publish our findings; to Dr. R. Pooler and Dr. F. J. Davidson for clinical material; to Prof. I. Gordon and Dr. J. Wainwright for necropsy findings; to Dr. M. W. Susser, Dr. Z. A. Stein, and Dr. L. S. Lange for clinical assistance; and to Prof. J. Maisin for encouraging us to make this preliminary report.

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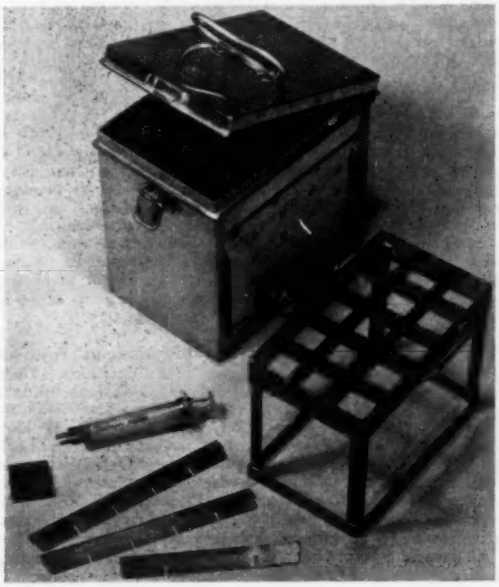
New Inventions

ST. JOHN'S HOSPITAL SYRINGE CARRIER

A CENTRAL syringe-sterilising service is essential to all hospitals but it involves much time-consuming labour in the wrapping of individual syringe pistons, barrels, and needles. The materials involved—polyethylene, glass, metal, and specially tailored cotton containers—are all expensive.

The container illustrated here has been designed to solve these problems so far as the anæsthetist is concerned. It consists of a box measuring $7^1/_2 \times 5 \times 7^1/_2$ in. and containing a frame holder designed to take 14 assorted syringes and 15 needles. By manipulation of the central bars the contents can be varied to suit an individual operating-list, and combinations of syringes varying from 2 ml. to 20 ml. in capacity can be arranged for sterilising to suit individual requirements.

All parts of this carrier are easily removable for cleaning. It can be used in an autoclave or in a hot-air oven. Its construction of heavy-gauge copper enables it to withstand heavy wear. Cultures placed inside an assembled syringe in the centre of the box and surrounded by a full complement of syringes have been rendered sterile in experimental tests.



This instrument is made by Messrs. W. H. Bailey & Son Ltd., London, S.W.1.

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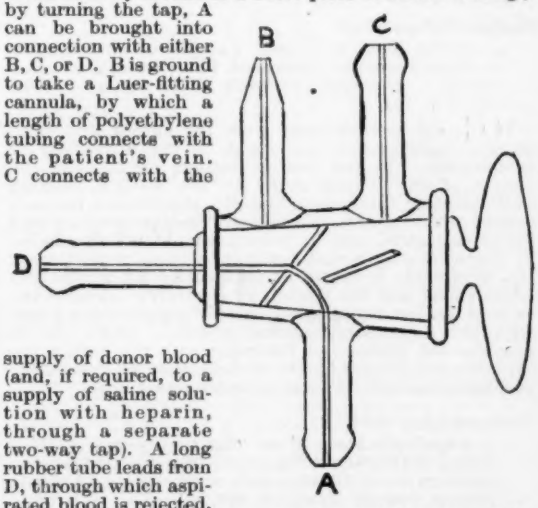
A THREE-WAY TAP FOR EXCHANGE TRANSFUSION

THE design of the tap, which is made of glass, is apparent from the accompanying figure. A syringe is fitted to A by means of a short piece of rubber tubing; by turning the tap, A can be brought into connection with either B, C, or D. B is ground to take a Luer-fitting cannula, by which a length of polyethylene tubing connects with the patient's vein. C connects with the supply of donor blood (and, if required, to a supply of saline solution with heparin, through a separate two-way tap). A long rubber tube leads from D, through which aspirated blood is rejected.



The two parts of the tap are dry-sterilised separately and assembled after the surface of the tap has been lightly smeared with sterile lubricant—e.g., soft paraffin.

The advantages of this glass tap over metal taps with a similar purpose are lightness and ease of cleaning and of sterilisation. It has been thoroughly tested in use over the past five years.

The tap is made by Camlab Glass Ltd., 50a, Burleigh Street, Cambridge.

DOUGLAS GAIRDNER
D.M. Oxfd, F.R.C.P.

Cambridge Maternity Hospital

Reviews of Books

Diseases of the Breast

C. D. HAAGENSEN, M.D., professor of clinical surgery, College of Physicians and Surgeons, Colombia University. Philadelphia and London: W. B. Saunders. 1956. Pp. 751. 112*s*.

THIS is the most important book on diseases of the breast which has appeared for many years. Dr. Haagensen is well known for his contributions to our knowledge of the breast, and he has now distilled the wisdom from twenty-five years' concentration on the subject. His data are the records, large in volume and perhaps unique in the detail with which they have been investigated, of the Colombia Presbyterian Center in New York over the past forty years. Dr. Purdy Stout has been the pathologist chiefly associated with Dr. Haagensen, and his influence is as clear in the text as in the beautiful photomicrographs.

Dr. Haagensen's chapters on the complex which used to be called chronic mastitis are interesting and thought-provoking, though not perhaps entirely in line with British thinking so far as epithelial proliferation is concerned. His chapter on mammary-duct ectasia is masterly, as one might expect from the man chiefly responsible for distinguishing this entity from chronic mastitis. More than half the book is devoted to carcinoma. The chapter on the choice of treatment contains a description of a method of trephine biopsy of lumbar vertebræ and its results, and it also discusses very fully the well-known criteria of operability of Haagensen and Stout. The sections on radiotherapy and hormone treatment are, as one might expect from a surgeon, shorter than the chapter on surgical treatment, in which Haagensen describes in detail the careful radical mastectomy on which he relies for the early case.

This work is a personal statement by a man who has read widely and thought deeply and objectively about breast disease, and who is humble enough to include a section on personal diagnostic errors. The book is well illustrated. It will command attention from all who are interested in its subject.

Human Perspiration

American Lecture Series: YAS KUNO, M.D., member of Japan Academy. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956. Pp. 416. 72*s*.

IT is some twenty years since the author first summarised contemporary knowledge of the physiology of perspiration. In the present volume he presents the results of his lifelong study of the subject, making available data from much hitherto unpublished research carried out in his own laboratory. The book will be read by physiologists, and its lessons should be assimilated by the thoughtful dermatologist and tropical practitioner; but it contains a wealth of information to interest the pædiatrician and the student of electrolyte metabolism, as well as the neurologist and the surgeon concerned with the autonomic nervous system. Above all, it provides the pleasure of following with the author the evolution of knowledge in a field that he has made peculiarly his own. This is an exhilarating book.

Schizophrenia 1677

A Psychiatric Study of an Illustrated Autobiographical Record of Demoniacal Possession. IDA MACALPINE, M.D., and RICHARD A. HUNTER, M.D., M.B.C.P., D.P.M. London: William Dawson. 1956. Pp. 197. £6 10*s*.

THIS beautifully produced volume gives a full account of the mental illness of an Austrian artist, Christoph Haizmann, in the year 1677.

Haizmann thought that he had made a pact with the Devil, and his illness broke out at the time when his agreement to sell himself to the Devil was due to take effect. His mental distress was relieved by exorcism and by what he and the priests who succoured him held to be the intervention of the Blessed Virgin. He then joined a religious order, and although tempted by apparitions of fiends managed to live fairly peacefully for another twenty-three years.

Haizmann left pictures of the Devil in the guises, all progressively more diabolic, in which he appeared to him on nine occasions, also of the miraculous worsting of the fiend by the Virgin. These are reproduced in colour, and the original manuscript of Haizmann is given in photolithography.

The body of the book is taken up by a full account of the painter's illness, and a discussion of this in relation to the development of Freud's theories regarding paranoia. The authors' previous examination of psycho-analytic thought, as exemplified in Freud's writings on the Schreber case, is here expanded.

Head Injuries and Their Management

FRANCIS ASBURY ECHLIN, M.D., C.M., M.SC., MED. SC.D., F.A.C.S., professor of clinical neurosurgery, New York University—Postgraduate Medical School. Philadelphia: J. B. Lippincott. London: Pitman Medical Publishing Co. 1956. Pp. 127. 24*s*.

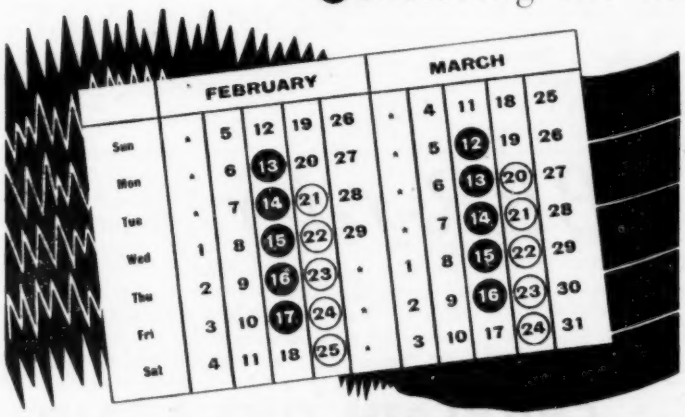
THIS is a sound and practical account for general surgeons of the handling of head injuries. The dangers of transporting unconscious patients in the supine position are, however, not emphasised; and the section on reablement and post-traumatic epilepsy are disappointing in comparison with the excellence of the chapters on the acute stage.

British Surgical Practice: Surgical Progress 1956 (London: Butterworth. 1956. Pp. 396. 47*s*. 6*d*.).—The latest volume of this work, edited by Sir Ernest Rock Carling and Sir James Paterson Ross, follows the course of its predecessors. Of the 11 original articles, all of them excellent, those by W. J. Sharrard on poliomyelitis, by D. H. Patey and A. C. Thackray on parotitis, and by F. W. Holdsworth on traumatic paraplegia seemed especially good. There are five critical surveys, Hamilton Stewart's beautifully illustrated contribution on partial nephrectomy being outstanding. The abstracts contain summaries of 150 important surgical papers, published mostly in 1955 and early 1956. The "noter-up" (an ugly title for a valuable section) keys the new information to the parent volumes. This is a useful book.

Diagnostic Procedures for Virus and Rickettsial Diseases (2nd ed. New York: American Public Health Association. 1956. Pp. 578. $7.50).—Since the first edition of this book, edited by Prof. Thomas Francis and Dr. Joseph E. Smadel, appeared in 1948 there have been important advances in the techniques of investigating viruses. The second edition thus appears very different from the first and includes a great deal of new information on tissue-culture techniques. For anyone who is starting to do work with viruses and who would like authoritative information on how to handle them this is a most valuable book. The treatment is very uneven, however, and there are some anomalies. It is surprising that measles is dealt with in half a page, while inclusion blennorrhœa has eight pages. The new adenoviruses are considered under primary atypical pneumonia; this is a doubly unfortunate chapter since it gives very little prominence to other diseases caused by adenoviruses, and it does not mention the recent work of Liu, Eaton, and Heyl on the virus which they recovered from cases of primary atypical pneumonia accompanied by an increase in cold hæmagglutinins. Finally, it is odd to see great stress laid on the hæmagglutination test in the diagnosis of dengue, while this valuable test is sadly neglected in the chapters dealing with other viruses of the same group—i.e., yellow fever and encephalitis viruses. Nevertheless this book is likely to be in frequent use in many bacteriological laboratories.

The Dental Treatment of Maxillo-Facial Injuries (2nd ed. Oxford: Blackwell Scientific Publications. 1956. Pp. 372. 47*s*. 6*d*.).—When first published, this book brought together in a small space most of the current knowledge on its subject. The second edition, edited by Sir William Kelsey Fry and Mr. Terence Ward, is basically the same book with the addition of a chapter on the use of antibiotics and a section on the use of alveolar wires. Many of the elisions and errors of the first edition remain uncorrected, and there is little reference to the vast increase in knowledge in the past fourteen years; but the book is well laid out, and the chapters on the general care of the patient, and particularly on feeding and on the use of antibiotics, are excellent.

Restoring the normal rhythm



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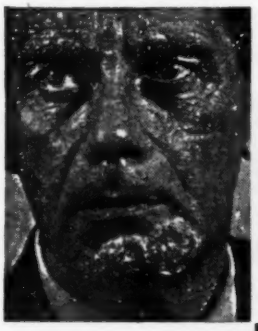

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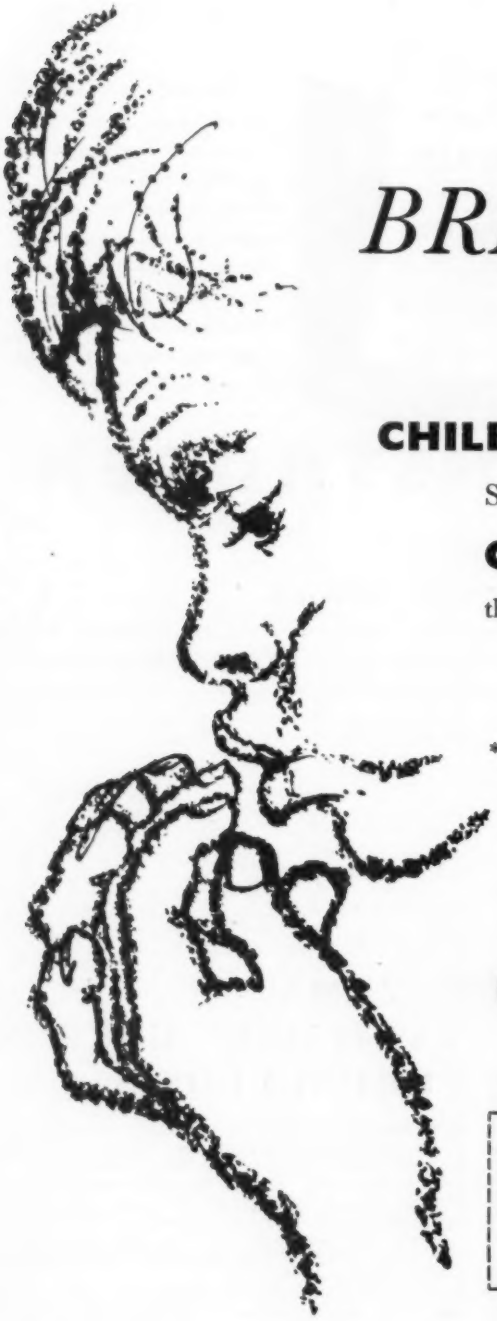

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THE LANCET
LONDON: SATURDAY, JAN. 12, 1957

The Support of Medical Research

AN international symposium on the support of medical research met in London two years ago [1] under the chairmanship of Sir HAROLD HIMSWORTH, and a report,[2] now published, represents the outcome of their deliberations. Few will disagree with the opinions and advice set out therein; but agreed aims on the final common purpose of medical research are hard to translate into action when they involve nations so far apart on the economic scale as Yugoslavia and the United States. In this respect the report is curiously detached: the meeting seems to have recorded no dissenting voices. It will be noted, however, that many of the ideas expressed at the symposium were previously embodied in the white-paper on clinical research in the National Health Service [3]; and the 81 articles to which the conference agreed suggest that the organisation of the Medical Research Council was accepted as a pattern. Certainly, the aims and purposes these articles embody are closely related to our own situation.

In Britain the State has become the great patron of research through, on the one hand, the University Grants Committee and the universities and, on the other, the Privy Council and the research councils. For the tremendous work done by the M.R.C. there can be little but admiration. It finances projects beyond the purse of the university; it seeks out promising men for research careers; it supports and develops good research wherever it is perceived; and it undertakes large international responsibilities, such as keeping track of the influenza virus, in the National Institute for Medical Research at Mill Hill. Before we pass it on for export and emulation, however, we should consider a question that is often asked and is hard to answer with certainty: does a large central institute, remote from medical schools and hospitals, drain away too much research and teaching talent from the universities? Perhaps the conference had qualms about this, for the report makes much of the traditional place of the universities in the expansion of knowledge; and it emphasises the importance to the investigator of teaching and other university contacts which often miraculously clarify his mind. Thus it is considered vital that the investigators should continue to teach and inspire the young, and that research organised by a central body should be closely integrated with university work.

The central body or research council has a heavy responsibility—for initiating research and for choosing and sometimes even discarding investigators. (The minds of those who must make early choice of promising investigators can never be free from anxiety about the human difficulties that may arise when a research-worker of, say, five years' standing has to seek ordinary professional work.) Since the members of the M.R.C. can hardly be expected to have supernatural powers of judgment, occasional errors are possible at all their levels of function; and it is therefore essential that the universities, with the help of patrons and private benefactors, should also be in a position to reach an independent evaluation of research, supporting it if necessary out of local endowment funds. There are indeed risks in too much government aid for medical research—for example, it could degenerate into applied research for the Services, or it could be subject to political control and interference. Though the M.R.C. and the profession are very much on their guard against such abuses in this country, others may be less favourably placed. Moreover, as Sir ERIC ASHBY [4] has explained, the patronage of private wealth is still important in maintaining academic freedom. In these days the private patrons are often big business firms, and the help which some of these have given, both at home and abroad, has been as enlightened as it is generous. ASHBY pointed out, too, that the universities are not always staffed by research geniuses in every department: first-rate administrators, enthusiastic teachers, and good reviewers and organisers are all needed. Because it is in a position to make far wider use of talent of all kinds, a university can maintain a flexibility denied to a body concerned only with research. When the head of a department has research talent, the university should be able to provide on his staff the administrative and teaching assistance needed to keep the balance, and vice versa. The report of the symposium recognises fully that the universities provide the intellectual climate best suited for research development and that it is with their work that the activities of the central research body should be most closely integrated.

If the universities accept this policy, some further hard spade-work, at both the preclinical and clinical levels, will lie ahead before all the fruits can be harvested. The symposium noted with regret the falling recruitment of medically qualified men and women to the preclinical sciences, but it did not mention the gross differences in salary which are largely responsible—and which must be corrected before the situation can really improve. If Northern Ireland can give its preclinical teachers distinction awards, it should not be impossible to ensure corresponding recognition of merit on this side of the Irish Sea. At the clinical end of medicine there are also obstacles still to be overcome. While the university clinical unit is strongly established in the Scottish schools and is expanding into almost all the provincial medical schools, the University of London has recently lost a professorial unit, and six of its twelve undergraduate schools have never had one. Whatever the merits and demerits of such units as a means of teaching, they have certainly become the focusing points for the development of clinical research. It is unfortunately obvious that the existing London units cannot absorb all the gifted and energetic young men seeking facilities for investigation. Without more academic bridgeheads into the clinical field the best-laid plans for research can come to nothing. The M.R.C. lacks

1. See *Lancet*, 1954, ii, 864.
2. The Support of Medical Research: A Symposium Organised by the Council for International Organisations of Medical Sciences. Edited by Sir HAROLD HIMSWORTH, F.R.C.P., F.R.S., and J. F. DELAFRESNAYE, M.R.C.P. Oxford: Blackwell Scientific Publications. 1956. Pp. 170. 17*s.* 6*d.*
3. See *Lancet*, 1953, ii, 123.
4. Ashby, E. *Listener*, 1955, **53**, 421, 455, 513.

the powers to create these bridgeheads, and the task has to be faced by the university, where it is capable of taking the initiative. If the universities wish to accept the proffered support for clinical research, they must make their own contribution in improving the organisation of university medicine. The need is urgent, since already a generation of young and promising workers in medicine are beginning to feel that their training and talents are not appreciated. Their enthusiasm can wither into cynicism, and we are in danger of either wasting their genius or allowing it to trickle away overseas.

Some non-teaching hospitals with whole-time staff are now winning a higher reputation for research and quality of service (which go hand in hand) than the older teaching centres. Such competition is healthy, but some teaching hospitals look as though they are failing to rise to the challenge. Unless they can read the writing on the wall, they will face slow decay. The teaching centres, in particular, while avoiding self-satisfaction, must accept the tasks of leadership with all the support which can be theirs for the asking. If the recommendations of this report are accepted as a policy to be pursued by the M.R.C., our universities must make equal efforts to ensure that the plan will work.

Hypotensive Drugs and Renal Function

IN the armoury of modern therapeutic weapons there are few with so wide a popularity as the drugs which reduce blood-pressure; and there can surely be no other treatment in which the target is so blurred, the aim so erratic, and the motive power so uncertain. How many patients receive homœopathic doses which have negligible effect on the blood-pressure? How many whose blood-pressure is effectively reduced have on that account a longer expectation of life, a greater freedom from complications, or even a relative relief from incapacitating symptoms? In how many do sudden or serious accidents follow lowering of the blood-pressure? On what criteria are we to select patients for treatment and what are the contra-indications? Nearly ten years after the introduction of the hypotensive drugs, there are, for the large majority of patients treated, still no clear answers.

In this issue we publish three articles from two groups of investigators who have been studying the effect of hypotensive drugs on renal function. Many patients with high blood-pressure are suffering from primary renal disease or from essential hypertension with renal involvement—so-called malignant hypertension. Since the prognosis is serious, there is a natural inclination to try any treatment that might help; so it is important to know whether renal function can really be improved by lowering the blood-pressure, or whether there is, in fact, a danger of impairing it further. High blood-pressure may worsen the prognosis in renal disease in a variety of ways: it may produce heart-failure, which in turn depresses renal function; it may give rise to cerebral complications, such as hæmorrhage or thrombosis, or more rarely to reversible attacks of hypertensive encephalopathy; it may lead to impairment of vision due to retinal hæmorrhages; or, more seriously, the malignant form of hypertension with papillœdema may ensue. All these complications are commoner in renal than in essential hypertension. Apart from extrarenal complications, there is good evidence, as the experiments of WILSON and BYROM [1 2] and of FLOYER [3] have shown in animals, that hypertension of sufficient degree produces renal vascular damage which may seriously affect prognosis. There are thus ample reasons for attempting to lower the blood-pressure in patients with hypertension of renal origin. But it is important to know whether it is safe to do so in the presence of impaired renal function, whether renal failure may be precipitated, and, on the positive side, whether the natural course of the disease may be prolonged by protecting the kidney from hypertensive vascular damage.

Occasionally idiosyncrasy to ganglion-blocking agents or excessive dosage may cause severe hypotension. As in circulatory shock, anuria may result [4] and it is then an urgent matter to raise the blood-pressure—for example, by methedrine or adrenaline injections. Apart from this mishap, which is usually avoidable, the healthy kidney possesses an effective mechanism for maintaining its circulation in the face of wide variations in systemic blood-pressure. A temporary reduction in glomerular filtration-rate (G.F.R.) and renal plasma flow (R.P.F.) and an increase in renal vascular resistance (R.V.R.) usually follow the administration of ganglion-blocking drugs, and may be observed even when the blood-pressure does not change.[5] Dr. GOLDBERG reports on p. 74 that the effect of hexamethonium on R.V.R. depends on the initial state of renal function, impaired function being associated with increased R.V.R. MOYER [6] found that in hypertensive patients reserpine did not affect G.F.R. and R.P.F. GOLDBERG adds that preliminary treatment with reserpine does not alter the effects of hexamethonium on renal circulation. Apresoline differs from the other hypotensive drugs in producing an increase in renal blood-flow.[5] These observations on the "acute" effects of the hypotensive drugs do not seem to be of much immediate value in predicting the results of treatment, particularly if renal function is impaired. Apresoline should be the drug of choice, since an increase in R.P.F. might be expected to improve kidney function. Unfortunately it has proved disappointing in the treatment of patients with renal hypertension. On another page Dr. MCDONALD and Dr. GOLDBERG report that, in essential hypertension, maintenance therapy with oral pentapyrolidinium bitartrate ('Ansolysen') and reserpine produces no diminution in renal blood-flow or other evidence of renal ischæmia; and they conclude that in patients with initial renal impairment simple clinical tests of renal function, especially the blood-urea level, are an adequate guide to progress.

Dr. ABRAHAMS and Professor WILSON describe the effects of ganglion-blocking agents, with or without reserpine, in patients with varying degrees of renal impairment due to primary renal disease or malignant hypertension. Repeated measurements of blood-urea, urinary urea concentration, and creatinine clearance were made during short treatment for two to four weeks and during maintenance therapy continued for up to two years. Satisfactory reduction of blood-

1. Wilson, C., Byrom, F. B. *Lancet*, 1939, i, 136.
2. Wilson, C., Byrom, F. B. *Quart. J. Med.* 1941, **10**, 65.
3. Floyer, M. A. *Clin. Sci.* 1951, **10**, 405.
4. Carter, A. B., Payne, R. W. *Lancet*, 1956, ii, 537.
5. Mackinnon, J. *Ibid*, 1952, ii, 12.
6. Moyer, J. H. *Ann. N.Y. Acad. Sci.* 1954, **59**, 82.

pressure did not lead to further deterioration of renal function unless considerable impairment was initially present—i.e., blood-urea over 70 mg. per 100 ml. and creatinine clearance less than 30%. They emphasise, however, the need for accurate diagnosis of the underlying renal disease; for reduction in blood-pressure is more likely to precipitate uræmia than in patients with a progressive active nephritis (e.g., chronic type-II nephritis) in patients with a relatively inactive inflammatory lesion, such as chronic type-I nephritis or chronic pyelonephritis, in which hypertensive renal damage is now thought to be the dominant cause of renal failure. ABRAHAMS and WILSON point out that in many patients with chronic renal disease the sudden deterioration of renal function in the late stages is preceded by a relatively abrupt rise in blood-pressure. If therapy is introduced at this point, and the hypertension is well controlled, there is evidence that the onset of renal failure may be delayed. In those patients who persevered with treatment, the malignant form of hypertension, so common in renal disease, was not observed. These clinical results lend support to the conclusions derived from experimental studies in animals—namely, that, in certain forms of chronic renal disease, hypertension leads to renal vascular damage and accelerates renal failure. Nevertheless, when renal disease has progressed to the stage of nitrogen retention, hypotensive therapy can lead to only a limited increase in the expectation of life—a few years at the most. As in essential hypertension, cerebral vascular accidents remain a major hazard.

Vancomycin

THE present-day pharmaceutical equivalent of the Gold Rush is the intensive and systematic screening of soil samples for new antibiotics. Thousands of soil samples are being collected by amateur and professional mycologists all over the world, and submitted to various industrial and university laboratories. Aqueous extracts are prepared and analysed for their microbe content, and these organisms are then screened for possible antibiotic activity. Many samples may seem promising at first, but only a few satisfy the rigid criteria demanded for clinical trial. To the investigators' chagrin, some promising antibiotics turn out to be identical with those already in clinical use; and others become discredited by their toxicity. Finally, one out of the thousands of soil samples survives the stiffest of hurdles, clinical evaluation, and is acclaimed on an Olympic pedestal alongside its predecessors. Various species of the genus streptomyces have so far produced streptomycin, chloramphenicol, neomycin, chlortetracycline (aureomycin), oxytetracycline (terramycin), nystatin, erythromycin, carbomycin, novobiocin, and oleandomycin.

A recent addition is vancomycin, isolated from soil obtained in Borneo and India. Although vancomycin-producing strains were subsequently found in soil from other parts of the world, including North America, the species has been designated *Streptomyces orientalis*.[1] Vancomycin hydrochloride is a white solid, very soluble in water, and relatively stable.[2] It is bactericidal, and, like that of penicillin, its principal action is against gram-positive bacteria, particularly when they are multiplying. Organisms sensitive to it include pneumococci, streptococci, staphylococci, and clostridia. FAIRBROTHER and WILLIAMS[3] recently reported that, in vitro, the gram-negative gonococcus was also highly susceptible. The main indication for the use of vancomycin, however, is an infection due to strains of *Staphylococcus aureus* resistant to other antibiotics. This usually implies a strain found in hospitals, where the wide use of antibiotics has encouraged the emergence of drug-resistant organisms. It is fortunate that such strains are at present rarely encountered in infections outside hospitals; but how long they will remain thus confined no-one can say. In-vitro sensitivity tests must be performed before the most potent antibiotic can be chosen to deal with a serious staphylococcal infection. Until the results are available, the clinician must in an emergency decide which agent is most likely to be successful. If the infection has been contracted outside a hospital, penicillin will probably and tetracycline will almost certainly be effective. On the other hand, *serious* infections contracted in hospital should be treated at the outset with an antibiotic which is in least current use in that particular hospital. This will do much to ensure early control of the organism and may prevent an outbreak of cross-infection in the ward. As we have often declared, the wisest course is to hold in reserve an antibiotic which will subdue staphylococci that are resistant to other forms of attack; erythromycin has been the one most often held back in this way, and there have been signs that chloramphenicol was returning to popularity, despite its occasional association with blood disorders. The introduction of other antistaphylococcal drugs, including vancomycin, novobiocin, and oleandomycin, now permits a wider choice for the strategic reserve. If the laboratory report subsequently shows that the reserved drug is not the only one to which the infecting organism is responsive, then the erythromicin (or whichever drug it is) can go back into reserve. The actual reserve drug for each hospital should be changed from time to time in the light of laboratory reports.

Whereas novobiocin and oleandomycin are well absorbed from the intestine, vancomycin must be given intravenously to produce any action other than in the intestine. After either oral or intravenous vancomycin, the fæces become odourless and strains of clostridium and *Streptococcus fæcalis* disappear or become much fewer, but the gram-negative flora persists. The persistence of the gram-negative organisms in the intestine should prevent the emergence of yeasts, and mucocutaneous moniliasis has not so far been reported after the administration of vancomycin. When vancomycin is taken by mouth most of it is excreted in the fæces and only negligible amounts can be detected in the blood or urine. After intravenous injection, it is rapidly excreted in high concentration by the kidneys. As only small quantities reach the bile, it seems that vancomycin, unlike many other antibiotics, is not concentrated and excreted by the biliary system. It is detectable in pleural, pericardial, synovial, and ascitic fluids after intravenous injection. It does not diffuse into spinal fluid, which is not unexpected in view of the

1. Pittenger, R. C., Brigham, R. B. *Antibiot. Chemother.* 1956, **6**, 642.
2. Geraci, J. E., Heilman, F. R., Nichols, D. R., Wellman, W. E., Ross, G. T. *Proc. Mayo Clin.* 1956, **31**, 564.
3. Fairbrother, R. W., Williams, B. L. *Lancet*, 1956, **ii**, 1177.

relatively large size of the vancomycin molecule. The only toxic reactions observed by GERACI and his co-workers [3] at the Mayo Clinic were occasional rigors, erythematous or morbilliform rashes, and phlebitis at the site of repeated intravenous injections. The dose of oral or intravenous vancomycin is 0·5 g. six-hourly, continued for about one week, depending upon the severity of the infection and the response to treatment. Such doses have produced good results by mouth in staphylococcal enterocolitis and intravenously in staphylococcal septicæmias and osteomyelitis.

It remains to be seen whether vancomycin is best used alone or in combination with another antibiotic. It is even more important for the community's sake to decide whether a combination of antistaphylococcal drugs is more likely to delay the emergence of resistant organisms, as it does in the chemotherapy of tuberculosis. Strains of staphylococci made resistant to vancomycin in vitro retained their sensitivity to other antibiotics, suggesting that so far there seems to be no cross-resistance between it and other antibiotics. This is a point of some importance; for new antibiotics are not really welcome unless they remain therapeutically distinctive. Chemically similar analogues of antibiotics tend to have the same disadvantage of cross-resistance, and they are no more helpful when given in combination.

Annotations

WELCOME TO A CENTENARIAN

AMONG the long-established medical weeklies of the world, the *Nederlands Tijdschrift voor Geneeskunde* is individual alike in character and in the way it is managed. Formerly the journal of the Netherlands medical association, it became after the war a purely scientific weekly, and its ownership passed to a separate society, of some sixty members, who produce it for the benefit of the medical profession. Both the editor and the assistant editor hold university chairs (Dr. J. R. Prakken in dermatology at Amsterdam and Dr. J. W. Duyff in physiology at Leiden), and the only full-time medical member of the staff is the secretary (Dr. M. M. Hilfman); but they have the help of a small board, consisting mostly of professors, who serve for three years and afterwards become members of the society. Last week, when the journal started on its second hundred years, it changed its familiar small format for a larger one with double columns, which its friends will come to like even better. Normally there are English summaries of all the articles; but the century opens with a special issue composed of some of the best contributions previously published. The story of the last fifty years is told in a commemorative volume, by Dr. C. T. van Valkenburg.

At the decorous but cheerful celebrations in Amsterdam last Saturday, the other centenarian medical weeklies were represented by the editors of the *British Medical Journal*, the *Ugeskrift for Læger*, and *The Lancet*.

HUMAN RELATIONS

THE Tavistock Institute of Human Relations has the responsible and exacting task of providing training and conducting research in the social sciences related to psychological medicine, and acting as consultant to industrial organisations, Government departments, and community services. It is heartening to learn that, thanks to the support of American foundations, its annual budget for this work in the coming years will be of the order of £100,000. About half of this will go to the projects which the institute has undertaken jointly with the Tavistock Clinic and the other half to independent social-science programmes outside the medical field.

From the start of the National Health Service, the North West Metropolitan Regional Hospital Board has supported the educational work of the institute, especially through the postgraduate courses offered at the Tavistock Clinic for psychiatrists, psychologists, child psychotherapists, and social workers. External courses have also been run for general practitioners, public-health workers, teachers, probation officers, family-care workers, and industrial personnel officers, including students from overseas. For this side of its work the institute received last year from the Old Dominion Foundation £89,000 (to be spent over seven years) and from the Grant Foundation £25,000 (to be spent over three years) which was given specially for the training of people working among children and parents.

During 1956 the institute also received grants for its research. The Ford Foundation gave £80,000 (to be spent over five years) and the Josiah Macy, jun., Foundation £13,000 (to be spent over three years). It is planned to extend the work of the institute's child development unit from problems arising from the deprivation of maternal care, to which it has been giving special attention, to the conditions which promote the development of a healthy personality. Another research group has been making an exploratory study of a small number of London families who have different incomes but are otherwise alike. This work grew out of experience in marriage-counselling at the clinic and at the institute's Family Discussion Bureau, and towards it the Grant Foundation has given £5000 to be spent during 1956 and 1957.

The Home Office, the London County Council, and British foundations which have aided the institute with this work in the past will share the institute's pleasure at this international recognition of its work and practical help towards its achievement.

BODY FAT IN CHILDHOOD

"PUPPY fat" is a convenient term of abuse or of defensive hope for the future: it covers, perhaps, a multitude of sins. Just what it connotes anatomically, however, is harder to say. Recently reliable growth curves for subcutaneous fatty tissue in childhood have been prepared, thanks to the efforts of those engaged in longitudinal studies here and in America. There are four methods of obtaining information about body fat: by taking soft-tissue radiographs, which enable the investigator to distinguish and measure individually the bone, muscle, and subcutaneous tissue; by pulling with the thumb and forefinger a fold of skin and subcutaneous tissue away from the underlying muscle and measuring its thickness with pinch-callipers; by calculation from the specific gravity of the body, itself obtained through underwater weighing and application of the principle of Archimedes; and by calculation from the amount of body-water estimated by chemical or isotopic dilution techniques. The last two of these have not yet yielded sufficient data during childhood to warrant much discussion, though potentially they are the most valid measures of the amount of total body fat, since the other methods measure only the thickness of the subcutaneous layer. There is, however, good evidence [1] that the internal fat is, under most circumstances, closely proportional in amount to the fat stored beneath the skin.

The soft-tissue X-ray technique was initiated by Stuart [2] and his associates at Boston, who studied the

1. Brozek, J., Keys, A. *Brit. J. Nutr.* 1951, **5**, 194.
2. Stuart, H. *Monogr. Soc. Res. Child Develop.* 1940, **5**, no. 3; *Child Develop.* 1942, **13**, 195; *J. Pediat.* 1946, **28**, 637; *Child Develop.* 1950, **21**, 229.

growth of bone, muscle, and fat in the calf of the leg. It has been elaborated by Reynolds [3] and his successor Garn,[4] at the Fels growth study in America, and in this country by Tanner [5] at the Harpenden growth study, where techniques have been developed for obtaining quantitative tissue-growth data for arm, calf, and thigh. Measurement by skinfold calipers has a much longer history, but the results are less illuminating than they might have been because of the absence of an efficient calliper giving a constant pressure to the skinfold at all thicknesses picked up, and also of a generally agreed technique. Recently, however, a wide acceptance has been found for the Harpenden skinfold calliper,[6] and Hammond's extensive cross-sectional survey [7] of skinfolds from age 2 to 18 has been reported in these terms.

The main growth curves of subcutaneous fat are now fairly clear. From the age of 1 year onwards there is a steady loss of fat; the amount lost per year becomes smaller and smaller as the child gets older, until somewhere between five and eight there is neither loss nor gain. After this, fat gradually begins to accumulate, and this process continues to adult life, with the exception that for a year or more at adolescence boys lose fat and girls usually cease to gain it. The greatest rate of fat increase, at least in boys, is immediately before the beginning of the adolescent growth spurt, and this gain has been called the pre-adolescence fat spurt.[5] It is this period which is usually called the "puppy fat" one: anxious parents can be assured that the boy will lose a good deal of this fat during the next two years; but they should also be warned that most or all of it will return during the two or three years after that, unless something is done to restrict the intake of food.

The course of events during the first year of life is intriguing and may have more profound physiological implications. The details have been clarified in a new paper by Garn [8] in which, in contrast to so many studies of growth, exemplary use is made of the longitudinal nature of the data. Between birth and three months the infant puts on a very great deal of fat; the calf subcutaneous tissue at the maximum diameter increases on average by 5·7 mm. between one and three months. Between three and six months the increase is 4·6 mm. and between six and nine months 0·7 mm. Thereafter calf fat decreases; the average infant is fattest at nine months of age. Some babies, however, start losing fat at six months, and about 15% are still gaining at one year. Though Garn's study was of the calf only, the skinfold calliper data of the Child Study Centre in London [9] show exactly the same time relations for fat over the arm and on the trunk. What is the physiological mechanism of this wave of fat deposition and withdrawal in infants we have no idea. We do not know whether fat at this period goes into the same fat cells as the fat accumulated later, or even whether its composition is the same. In trying to explain the genesis of different body builds, Tanner [10] has suggested that fat cells, like muscle cells, may be laid down in utero, and that the ability to become fat, so to speak, may be limited by the number of cells present, just as is the ability to grow large muscles. If so, one wonders whether relatively great fatness in the infant presages the necessity for diet in the adult. Or perhaps the physiology of the infant is really quite different? Clearly this period provides uncharted ground for the pædiatrician with a flair for investigation.

3. Reynolds, E. L. *Child Develop.* 1944, **15**, 181; *Anat. Rec.* 1948, **102**, 45; *Monogr. Soc. Res. Child Develop.* 1950, **15**, no. 2.
4. Garn, S. M. *Hum. Biol.* 1953, **25**, 144; *Ibid*, 1954, **26**, 59.
5. Tanner, J. M. Growth at Adolescence. Oxford, 1955; *Nature, Lond.* 1955, **176**, 1180.
6. Edwards, D. A. W., Hammond, W. H., Healy, M. J., Tanner, J. M., Whitehouse, R. H. *Brit. J. Nutr.* 1955, **9**, 133.
7. Hammond, W. H. *Brit. J. prev. soc. Med.* 1955, **9**, 201.
8. Garn, S. M. *Hum. Biol.* 1956, **28**, 232.
9. Tanner, J. M. International Children's Centre Conference of International Growth Studies, London, July, 1956.
10. Tanner, J. M. *Advanc. Sci.* 1955, **12**, 116.

RESEARCH IN ROAD ACCIDENTS

IN the public eye, the bogy of road accidents has lately been obscured by some bigger ones. Though between four and five thousand people are killed on the roads every year in Britain, about as many commit suicide, many more are killed in home accidents, and four times as many die from lung cancer. But the misery (about ten people are seriously injured for every one killed) and the economic damage caused by road accidents are shocking enough, especially when we consider that nearly every casualty could be prevented by imposing a speed limit of ten miles an hour. If the public conscience condones this sacrifice to the need (or lust) for speed, the least we can do is explore every means of reducing the numbers of killed and seriously injured, both by preventing as many accidents as possible and by mitigating the severity of the rest. If St. George will not slay the dragon, he must try to blunt its teeth.

Two years ago [1] when we discussed various ways of doing this, more research into the nature and cause of accidents was clearly needed. Unless we know the most important causes of injury we cannot direct our efforts to the most profitable end. A new pamphlet,[2] prepared by the Department of Scientific and Industrial Research, gives some account of research done in the United States, where the death-rate on the roads is even higher than it is here (705 people were killed during the recent Christmas holiday). Much of this research was done at Cornell University Medical College.

The information is being gathered in three ways: (1) details of accidents and the injuries sustained in them are collected in sample areas; (2) accidents are studied experimentally, using dummy passengers, cine-films, and other recording equipment; and (3) protective devices are designed and tested. Many results are to hand and have already been applied in the design of vehicles in the United States.

Many injuries fatal to the driver were caused by his chest striking the steering column. The risk can be lessened either by padding the hub of the wheel, which distributes the force of the blow over a wider area, or by using a wheel which projects several inches above the hub, so that most of the force is spent in bending the supports of the wheel. To minimise the serious injuries to the head, face, and knee caused by the dashboard or other parts of the car, these parts may be strategically padded with foam plastic. Crash-helmets would also be useful, though motorists would probably be even harder to persuade to wear them than are motorcyclists. Windscreens and doors accounted for nearly as many injuries as the steering-wheel and dashboard. The risk of striking the head against the body of the car can be reduced by safety harness, which must be attached to the frame of the car and not to the seat, for if the seat is dislodged in a collision and its weight added to that of the sitter, the force with which he strikes the body of the car will be greater. Perhaps most helpful, and less cumbersome to the motorists, are improved door-locks; for the chances of being killed or badly injured are doubled if the occupant is thrown out of his car.

Most of these devices can now be fitted to modern production models as extras if the purchaser wants them. It will be noted that they protect only those inside the vehicle, which is appropriate in a country such as the United States where three-quarters of the deaths are

1. See *Lancet*, 1956, ii, 797.
2. Research on Injuries Sustained in Road Accidents. By H. J. H. STARKS, B.SC., PH.D., D.I.C., F.INST. P. Road Research Technical Paper no. 37. H.M. Stationery Office (for the Department of Scientific and Industrial Research). Pp. 14. 2*s*.

in motor-vehicle drivers or passengers (most of the other deaths are among pedestrians and only about 1% each among cyclists and motor-cyclists). But in Britain only a sixth of those who die are motorists; nearly half are pedestrians, a quarter motor-cyclists, and the rest pedal-cyclists. The American findings can be used in this country and may save the lives of motorists (though different road conditions and styles of vehicles may lead to different injuries here), but it is important to find ways of protecting other road users. Some research has been done in the nature of their injuries (thus, in motor-cyclists most deaths are due to head injury and the legs are damaged more often than the arms, while in pedal-cyclists the arms suffer more than the legs), but there is much more to be learned. Three phases of research, similar to those undertaken in the United States, are planned; the first has begun on a small scale in Slough. Protective clothing, improved external design of vehicles to protect pedestrians, and alterations to motor-cycles to protect the riders are foreseen.

Everything that can be done by improved design of vehicles must be done, but more might be gained by improving the roads and changing the laws governing those who use them. It is even more important to realise (and constantly remember) that no big reduction in the number of dead and injured can be expected until more care and skill are shown by those who use the roads.

FAST VITAL CAPACITY

THE measurement of lung volumes has long been used in the assessment of respiratory disease, and the determination of vital capacity not only is easy for the patient to understand and perform but also requires only a spirometer for its execution. The introduction of respiratory rate and capacity into lung-volume tests came with the measurement of maximum breathing capacity (M.B.C.); this measurement was designed to estimate the patient's over-all ability to move air into and out of the lungs, and the result therefore depends on the muscular effort achieved as well as on the physical properties of the lungs.

More recently the "timed vital capacity" has been advocated; in this test the patient makes a maximum volume shift of air into or out of the lungs as rapidly as possible, and the volume is recorded against time. These manœuvres give the inspiratory fast vital capacity (I.F.V.C.) and expiratory fast vital capacity (E.F.V.C.) respectively, and from the resulting curves information can be obtained about the state of the lungs; the curve itself is interpreted in one of two ways, either directly or as it relates to the M.B.C. These interpretations have been discussed by Bernstein and Kazantzis [1] and by Shephard.[2] The direct interpretation of the curve relies, for example, upon the measurement of the one-second volume, while the interpretation of the M.B.C. is more closely connected with the maximum flow-rate achieved—on the hypothesis that the M.B.C. test allows the respiratory effort to operate over the optimal parts of the E.F.V.C. and I.F.V.C. curves in such a way that the shift of air is a maximum.

Such tests, depending as they do on the measurement of rapidly changing quantities, require apparatus that can respond quickly and without "overshoot" if the results are not to give rise to misleading interpretations. Indeed, some of the earlier work on F.V.C. was carried out on the conventional heavy spirometer bell and gave false results. More recently a lightweight spirometer bell or the pneumotachograph has been used to measure volume shift in F.V.C. The pneumotachograph measures air-flow rate and requires integration over time to give volume; it has been used by Shephard [2] to investigate F.V.C. Both these types of apparatus offer little resistance to respiration, and both seem suitable for rapid F.V.C. measurements; interference from such factors as inertia of the bell and the temperature of the respired gas is of little significance. Shephard points out, however, that the complex resonating system, made up of the spirometer bell and the U-loop of the water seal, linked together by the elastic gas volume, introduces certain errors when the F.V.C. is recorded by the spirometer. These errors include the failure to indicate the true starting-point of the manœuvre, and the obscuring of the end-point of the one-second volume capacity by bell oscillations. Shephard considers the volume delivery over the first second to be the most useful measurement derived from the F.V.C., provided that it is related to the total time of delivery, and he admits that for this measurement the errors introduced by the lightweight spirometer bell are unimportant clinically. Thus, for this purpose the more complex apparatus needed for pneumotachogram recording and integration is unnecessary.

It is claimed, not without reason, that the F.V.C. test is much less exacting for the patient than the M.B.C., and that the F.V.C. can be made to give as much information as, or more than, the M.B.C. Though these claims are probably true, it must be remembered that it is only the volumes of gas shifted and the rate of shifting which are being measured, and not the pressures required to produce the movement. When volumes only are measured there can be no indication of the respiratory work involved, which is determined by both pressure and volume changes during respiration. In so far as respiratory work is important, as in emphysema, F.V.C. by itself provides an incomplete assessment of the respiratory state of the patient; and this view accords with the conclusions of Attinger et al. to which we lately referred.[3] Nevertheless, the F.V.C., when properly performed and interpreted, can give valuable information, and it is a satisfactory compromise between the extent of the measurements required and the increasingly complex and specialised apparatus necessary for the collection of important data.

1. Bernstein, L., Kazantzis, G. *Thorax*, 1954, **9**, 326.
2. Shephard, R. J. *Ibid*, 1956, **11**, 223.

THE REFUGEES

WHATEVER their plans, Hungarian doctors who have reached this country are eager to learn English without delay.

Many education authorities run courses in English for foreigners, and some propose to start special courses for Hungarians. In London application should be made to the education officer at County Hall, S.E.1, in writing or in person (room 76) or by telephone (Waterloo 5000, extension 441). The county council is waiving fees.

The B.B.C. has a series of quarter-hour English lessons, for those who already know some English, each day on its European service (232 metres) starting at 5 and 6.45 A.M. and 12.15, 5.15, 7.15, and 9.15 P.M. The 9.15 P.M. transmission is likely to be heard best; and at this time classes at elementary level are given on Mondays, Wednesdays, and Fridays.

Two special long-playing records to teach English from the start have been made for the B.B.C. These are obtainable at 15*s*. each, and two corresponding textbooks at 2*s*. each (or 3*s*. 6*d*. for the two), from the B.B.C., English by Radio, Bush House, London, W.C.2. Cheques should be made payable to the B.B.C. Club. Alternatively, copies of the records and books may be borrowed from *The Lancet* office.

A series of five books for instruction by the direct method is published by Berlitz, and is obtainable from K. Sussapfel, Publisher, 36, Maiden Lane, Strand, London, W.C.2. The first of these costs 6*s*. 6*d*. (plus 9*d*. postage).

Further offers of temporary homes for Hungarian doctors may be addressed to this office and are likely soon to be taken up—especially those from the London area. The fund established by *The Lancet* to meet special immediate expenses of medical refugees and their families is being distributed. Applications—and further contributions—are invited.

3. See Annotation, *Lancet*, 1956, ii, 1034.

Special Articles

MEDICAL ADMINISTRATION IN MENTAL HOSPITALS *

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THE clinical side of work in mental hospitals has greatly expanded in recent years, and it is largely because of this that there is discontent among some consultant psychiatrists who are not medical superintendents. I shall try to analyse the present situation from the point of view of the clinical consultant, though I am fully aware that other interpretations of this situation can be given.

Perhaps the first impulse has been to stifle this discontent, or to ignore its existence; but in the long run suppression exaggerates the difficulties, whereas public discussion will lead to a constructive and healthy solution. We must not forget, as Stanton and Schwartz (1954) have so admirably shown, that dissent in high places produces only one result—deterioration in the patient's behaviour and morale.

Advances in treatment, a greater knowledge of the causes of mental illness, and far-reaching changes in legislation have produced a greater readiness to accept treatment in the early stages of mental illness, and consequently the number of annual admissions has greatly increased. In 1929, the year before the Mental Treatment Act came into force, the annual admissions to mental hospitals in England and Wales were 22,000, whereas in 1954 they had increased to 71,000 (Logan 1956). In addition there has been a considerable increase in the number of outpatient attendances at the clinics associated with the mental hospitals.

All this has meant that much more time has been spent in investigating and treating individual cases. Much of this work has fallen to the lot of the clinical consultant. Since the emphasis has now shifted from custodial care to active psychiatry, we must ask ourselves whether the present administrative arrangements embodied in the Lunacy Act, 1890, and the Mental Treatment Act, 1930, are best suited to deal with this new burden.

Results of Investigation

I have investigated the present situation by sending a questionary to clinical consultants in thirty of the larger mental hospitals in England and Wales. To this I have had twenty-five replies, and I am much indebted to the consultants concerned for the care they have taken in presenting the facts. Briefly these are:

Five consultants stated, without any reservations whatsoever, that the present methods of medical administration were completely satisfactory, and that no difficulties of any kind had been experienced.

Against this, in four of the hospitals considerable dissatisfaction was expressed, so much so that a near breakdown in interpersonal relationships seemed to have existed.

The remaining sixteen consultants, though admitting that the present arrangements could and did work harmoniously, given a sensible and liberal interpretation of existing statutes and rules, nevertheless qualified this in some way or another.

In the four hospitals where greatest friction existed, this arose largely because the medical superintendent had so interpreted the legal position as to regard himself as the final authority not only in administrative matters but also in clinical ones and had accordingly thought it his duty to authorise and select the type of treatment of any patient he wished.

One consultant held that this attitude had in the past hampered the progress of mental science by certain treatments having, in some hospitals, been actually prohibited.

Another said that a consultant in the mental-hospital service had a much lower status than consultants in other branches of medicine.

All agreed on the lack of complete responsibility felt by the clinical consultant.

In the sixteen hospitals where relations were harmonious but some dissatisfaction with existing arrangements was expressed the following observations were made:

Six of the consultants thought that the only realistic way to make the existing legal arrangements harmonious and satisfactory to all concerned was to have an effective, responsible, and properly constituted medical advisory committee to settle any differences in private without reference to lay committees.

One consultant emphasised that the medical policy of the hospital as a whole should be constantly under review by such a committee, which should not be used solely to bolster up the authority of the medical superintendent when he found himself in difficulties with his lay committee, as was sometimes the present tendency.

Three others suggested that it was no longer possible to run a modern mental hospital on authoritarian and dictatorial lines, because this would inevitably lead to a great deal of friction and would make conditions impossible not only for the clinical consultant but also for the medical superintendent, and the people who would suffer most would be the patients.

The least difficulties seemed to have arisen where the medical superintendent had direct clinical charge of some of the patients:

Three of the replies showed that, in this connection, the most effective way of meeting the various difficulties connected with medical administration was the introduction of "clinical firms," one under the direction of the medical superintendent and others under that of clinical consultants, the latter having complete autonomy concerning the admission and discharge of patients under their care. It is of interest here to note that the Expert Committee on Mental Health (1953) regards the treatment of each patient as "a team responsibility in which several doctors and several nurses actively participate." Even with such arrangements into teams, it was pointed out in one of the replies, it was still theoretically possible for a clash to occur, but it was equally possible for there to be no such clash and for all senior medical staff to have the status that they enjoyed in other specialties. Despite these conclusions it was nevertheless felt that some authoritative clarification of existing rules should be made because of other interpretations.

Three other consultants expressed the view that most of the difficulties arose because the consultant did not feel that he had complete charge of his patients, despite official assurances to the contrary.

Another thought that, if a consultant in the mental-hospital service did not experience a sense of full clinical responsibility, it was largely his own fault.

Lay administration was recommended by two consultants, while a third thought that this would some day overwhelm us all, whether we liked it or not.

One consultant was convinced that the mental-hospital consultant had now come of age and no longer required a "father figure"; but another would not be a party, under any consideration whatsoever, to the formation of any Secret Society for the Abolition of Medical Superintendents.

Another pointed out that, almost overnight, whether by accident or design, the position had been completely revolutionised by the introduction of the National Health Service Act in 1948, whereby clinical consultants were appointed in most of the mental hospitals, whereas they had previously been known as assistant medical officers. Unfortunately a tendency persisted in some mental hospitals for the medical superintendent still to regard all the other doctors in the institution, including the consultants, as his assistant medical officers, a state of affairs which caused considerable dissatisfaction.

Several consultants felt a sense of frustration because the regional hospital board and even the hospital management committee appealed to medical superintendents only when seeking advice about general medical policy in matters of psychiatry.

* Based on a paper read at a quarterly meeting of the Royal Medico-Psychological Association on Nov. 16, 1956.

Discussion

I shall state the problem as it appears to me after analysing all the opinions submitted. There are two factors which are to some extent mutually at variance yet must somehow be made complementary :

(1) *Mental hospitals differ from general hospitals* in that sound clinical administration is essential to establish within the hospital a therapeutic community in which the human and social needs of the patients (some of whom have to stay for a long time) are properly understood and adequately met (only two consultants mentioned this). It is difficult to see how such reforms as the "open-door hospital" could have come about unless the clinical administration had been in the hands of a clinically experienced medical administrator who could see the problem as a whole.

Maxwell Jones and Rapoport (1955) have drawn our attention to the importance of the concept of "administrative psychiatry" and have pointed out that "informal social processes are more important to therapy than has usually been assumed." The Expert Committee on Mental Health (1953) said "that the creation of the atmosphere of a therapeutic community is in itself one of the most important types of treatment which the psychiatric hospital can provide." It is furthermore pointed out that the nearer a mental hospital approaches the organisation of the general hospital the less successful will it be in applying effective psychiatry.

But, because of the changing nature of the clinical problem already outlined, such a régime is insufficient to meet the needs of psychiatry today. Important though it is, it must be coupled with ever-increasing clinical treatment of each separate case.

(2) *A traditional and fundamental requisite of all such individual treatment is that there should be a sound doctor-patient relationship.* By this I mean that the patient should be able to look to one doctor as personally responsible for diagnosing his illness and supervising his treatment. On the doctor's part it will be implicit that he will feel privileged that the patient has sought his advice, and that, if he values his reputation, he will not be content until he has given of his best. The Expert Committee on Mental Health (1953) said "it is . . . desirable that the patient, throughout his stay in hospital, should feel that there is one doctor who is his—one doctor who knows him well and whom he knows."

If such a relationship is the basis of all successful treatment, whether in general practice or in the specialties, it is especially so in psychiatry, where it is one of singular intimacy and subtlety. But it is in mental-hospital psychiatry that this traditional relationship is at its weakest, as many of the replies have shown, and it is here that the fundamental conflict arises, because, on the patient's admission to the mental hospital, this personal sense of responsibility felt by the consultant towards his patient is undermined. In the general hospital the physician or the surgeon admits the patient to one of his own beds and has absolute responsibility for him. In the mental hospital the patient, if certified, is committed in law to the responsibility of the medical superintendent, who alone can authorise his discharge, because Act of Parliament amended by Statutory Instrument (1948) no. 419 paragraph 4 designates him as the chief officer of the institution.

In actual practice amicable arrangements usually exist whereby the clinical consultant will discuss with the superintendent the question of discharge; but the fact remains that the superintendent has the power of veto and cannot be blamed if he uses it, since it can be interpreted that he alone is responsible if anything goes wrong.

The same remarks apply, though perhaps with less force, to voluntary patients. Whether certified or voluntary, a patient may sometimes become aware of a dispute about the advisability of his discharge. He may then realise that his case is not the sole responsibility of the consultant concerned, and his trust in the doctor looking after him may be damaged.

Not to have complete responsibility engenders a sense of frustration; and, if the mental-hospital service is to attract the right kind of doctors, it is vital that these arrangements should be modified. The Central Health Services Council (1956) states that the absence of a sufficient number of psychiatric consultants is related to the insufficient number of entrants into the specialty, the over-all shortage being about 20% of establishments.

By conferring full responsibility on the consultant as in other branches of medicine, his status will be correspondingly enhanced, and potential recruits might thereby be attracted in greater numbers than at present. What is perhaps more important, his therapeutic effectiveness will be strengthened, and he will come to have an accepted and authoritative position in society equal to that of the physician or the surgeon.

Suggestions

Because the requirements of effective administrative psychiatry and the need to give the clinical consultant full responsibility are to some extent conflicting, it is not easy to find or to apply a remedy; but it is essential that one should be devised without undue delay, for the scope of the mental hospital as regards the mental health of the community is likely to widen to a degree unknown at present, and the mental hospital may change out of all recognition.

I therefore make some suggestions as a basis for discussion.

Working Party

Now that the shortcomings of the present system of administration are so apparent that the public press has become interested, it is desirable that the Royal Medico-Psychological Association should appoint a working party consisting of equal numbers of medical superintendents and clinical consultants to examine this problem.

If clinical consultants are to have a more effective voice in shaping the future of psychiatry, they should be better represented in the various committees of the Association. The parliamentary committee of the association is composed of 29 members, of whom 16 are medical superintendents and only 2 are clinical consultants in mental hospitals. In defence of this it might be argued that superintendents have a greater interest in parliamentary affairs because of their statutory responsibilities, but the membership of the education committee of the association shows a similar distribution: of 38 members 24 are medical superintendents and only 4 are clinical consultants in mental hospitals.

Medical Superintendents

In the present stage of evolution of the mental hospital—because of the problems concerned with the establishment of a therapeutic community—medical superintendency should continue. It is furthermore essential that medical superintendents should continue to be pre-eminent in the clinical field, for only thus can they command the respect and allegiance of their medical colleagues. It is, however, difficult to see how outstanding men will be attracted to a post which daily carries more and more responsibility and less recognition. It might therefore be an advantage to introduce some features of the system of medical-staff organisation elaborated during the past thirty years by the American College of Surgeons and now widely practised in American hospitals generally.

Under this each specialty is organised into a team under the direction of a leading clinician whose chief endeavour is to maintain a high standard of clinical work in that specialty by continued supervision, by the organisation of regular clinical conferences, and by guidance of the work and training of junior staff. Such supervision does not, however, go to the length of placing one consultant in the position of directing or criticising another's work, thus avoiding one of the worst features of the present mental-hospital system existing in this country. Upon the leading clinician devolves much

administrative responsibility, and it is he who, with the help of a medical-staff committee, directly advises the lay administration on matters of medical policy.

It seems to me that such a system could well be adapted to the administrative needs of mental hospitals here, with a considerable raising of the general standard of clinical work, because the medical administrator would first have had to show that he was a clinician of the first rank. It might be objected that good clinicians do not necessarily make good administrators; but the two disciplines have much in common, and the organisation of courses in administration (already planned in this country) would do much to remedy any imperfections. The clinical consultant and the medical administrator would have a common goal, and the present regrettable tendency in the mental hospitals for a gulf to develop between them would be avoided.

The American system allows of full integration with other specialist services and with teaching and professorial departments. If such a system were applied here, the mental hospital in isolation would be a thing of the past, and it would become instead an effective unit for providing all psychiatric services to the community, and, acting through the Universities, it would in some cases perhaps also cater for the needs of students and postgraduates, which are at present inadequately met.

In this country medicine has tended to be very much of a personal affair between doctor and patient, and I have been at pains to emphasise the importance of this relationship; but there is already a tendency to organise some specialties into teams under the direction of a full-time professor, and if ever a specialty needed team-work it is psychiatry. Perhaps in some of the mental hospitals of the future the medical superintendent will come to have professorial dignity.

If such a system were adopted, it would be necessary to differentiate between the varying responsibilities of consultants, and the present methods of remuneration might therefore have to be revised.

Informal Admission

Coupled with such possible methods of administration there might also be an extension of developments already apparent in some of the more enlightened mental hospitals. I refer to the increasing tendency to admit patients informally to premises excluded from designation, as at Park Prewett, Warlingham Park, Graylingwell, and Mapperley Hospitals. Controversial issues over the admission and discharge of patients arising from the Lunacy Act and the Mental Treatment Act are in this way avoided. Perhaps we might also see the development of small psychiatric units, of 200 beds or so, attached to general hospitals and fully integrated with rehabilitation and other social services. We do not know for certain, but it might be possible in this way to prevent chronic mental illness in a large measure, as foreseen by the General Board of Control for Scotland (1956).

Sharing of Duties

It is essential that legislation should be introduced whereby the admission and discharge of patients should rest not only with the medical superintendent but also with the clinical consultant. This, together with the provision of smaller psychiatric units within the general organisation of the mental hospital, would give the consultant freedom to develop such units in his own way and in keeping with his own personality.

By all these means it should be possible for medical superintendents and clinical consultants to work together and to obviate the present tendency to a cleavage. Better understanding of the burdensome problems with which the medical superintendent has to deal might be gained if the clinical consultant could interest himself in some aspect of administration. At my own hospital, for example, I am privileged to deal with such matters as kitchen hygiene, and also the educational requirements of the nurses.

For a proper balance to be maintained it is furthermore desirable that the medical superintendent should be able to understand the point of view of the clinical consultant by himself having direct clinical charge of some beds.

Since many of the issues I have raised are controversial, it is only fair to state that at my own hospital relationships between the medical superintendent and the clinical consultants are happy and harmonious, and that many of the features I have mentioned receive de-facto recognition.

I wish to thank Dr. E. S. Stern for his generous help in preparing this paper, and also the numerous consultants, whose opinions have been freely quoted, but who must remain anonymous.

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THE REMUNERATION CLAIM

Statements after Meeting with Ministers

FOUR representatives of the Negotiating Committee, Sir Russell Brain, Dr. A. B. Davies, Dr. J. D. S. Cameron, and Dr. S. Wand, met the Minister of Health and the Joint Parliamentary Under-Secretary, Scottish Office, on Friday, Jan. 4.

The Minister of Health explained that he had not given a reasoned reply to the committee's supplementary memorandum because he had been advised that there were constitutional objections to his doing so. All that he could say about the legal aspect of the remuneration claim was that, according to the advice he had received, the Government were not under any legal contractual obligation to the profession. As to the merits of the claim, he could not even begin to examine these in the present economic circumstances of the country, since this, in his view, would start a "chain-reaction" in other quarters which would endanger the country's financial stability.

The representatives of the committee vigorously opposed the Minister's attitude and emphasised, in particular, that it was not merely a dispute about money but a crisis of confidence which went to the roots of the relations between the medical profession and the Government. At the end of a fruitless discussion the Minister offered to meet the committee's representatives again after he had given further thought to the problem and discussed it again with his colleagues. This offer was accepted and it was agreed that the further meeting should take place before the end of January.

After the meeting with the Ministers the Negotiating Committee met and unanimously expressed approval of the action taken by its representatives. Later on the same day, these representatives held a press conference. By this time the Ministry had issued its own press statement, in which it had again given the figure of 137% as representing the increase which had already taken place in the average pre-war remuneration of general practitioners. The Negotiating Committee's representatives explained to the press that this was an unfair and misleading statement, since it concealed the fact that the Spens Committee had found the actual pre-war incomes to be too low. The increase over the figure agreed with the Ministry, in the light of the Spens report, as the correct average in terms of the value of money in 1939 was only 100%.

The Ministry's press statement said that the claim was for an increase of not less than 24% over present

levels of remuneration (which in the case of general practitioners were on average already 137% above pre-war). The extra cost to the country would be about £20 million a year. The Minister had explained that the claim had *not* been rejected but, as he had already tried to make clear, the Government were responsible to the country for doing everything they could to combat inflation, and present economic circumstances made it impossible for them to consider the claim at the moment. In other words, nothing he had said expressed any opinion one way or another on the merits of the claim. It simply was that it could not be afforded under present conditions. Regarding the profession's contention that the Government were under a legal contractual obligation, the Minister had said that the Government were advised that this was not the case. The detailed reasons for this legal advice could not be given, for obvious constitutional reasons, in case of action against the Crown in the courts. He regretted that the claim could not be examined on its merits at the moment. He was already actively considering how best to deal with the problems raised by these issues, and all that the Negotiating Committee had said at their meetings with him on Aug. 1 and last week would be taken fully into account in this review.

Public Health

Antioxidants in Food

THE Minister of Agriculture, Fisheries, and Food has announced his decision to accept, with some changes, the Food Standards Committee's recommendations on antioxidants.[1] The use of four antioxidants (propyl, octyl, and dodecyl gallate, and butylated hydroxyanisole) will be allowed, up to certain limits, in "oils and fats, essential oils and butter used for manufacture." The committee's recommendation that the use of antioxidants should be disclosed to the purchaser is to be considered.

Occupations and Ages

Analysis of the complete figures on personal occupation derived from the 1951 Census [2] shows that of the occupied men 29% were aged under 30, and only 4% more than 65; of the occupied women 44% were under 30, while 5% were 60 or over. 88% of men aged 60–64, 47% of men aged 65–69, and 27% of men aged 70–74 were gainfully occupied, compared with 89%, 79%, and 53% respectively in 1921.

1. See *Lancet* 1954, ii, 711.
2. Census 1951, England and Wales: Occupation Tables. H.M. Stationery Office. 1957. £7 7s.

Infectious Diseases in England and Wales

Disease	Week ended December				
	1	8	15	22	29*
Diphtheria	7	4	6	10	3
Dysentery	727	830	808	696	348
Encephalitis:					
Infective	3	9	5	4	5
Post-infectious	3	3	2	2	..
Food-poisoning	191	247	319	177	112
Measles, excluding rubella	4514	5979	6497	6641	6878
Meningococcal infection	20	24	39	25	20
Ophthalmia neonatorum	31	34	23	18	19
Paratyphoid fever	1	2	2	2	2
Pneumonia, primary or influenzal	421	539	550	468	400
Poliomyelitis:					
Paralytic	47	55	49	42	39
Non-paralytic	25	27	24	18	10
Puerperal pyrexia	193	207	188	198	142
Scarlet fever	806	846	766	736	524
Smallpox	..	..	..	..	..
Tuberculosis:					
Respiratory	608	644	578	506	387
Meninges and C.N.S.	14	10	10	6	4
Other	63	75	79	64	56
Typhoid fever	3	5	1	1	2
Whooping-cough	2115	2131	1983	1742	1265

*Not including late returns.

Conferences and Congresses

HOSPITAL COCCAL INFECTIONS

ON Jan. 2 a symposium on hospital coccal infections was held in London, under the auspices of the Association of Clinical Pathologists, with Prof. A. A. MILES in the chair.

Dr. A. C. CUNLIFFE pointed out that hospital infection could be defined in clinical or bacteriological terms. Both must be used to obtain a true picture; for *Staphylococcus aureus* could be recovered from 10% of all wounds showing no clinical sepsis, whereas wounds might break down without being infected. The prevalence of sepsis had been falling before antibiotics were discovered; it was now rising.

Dr. R. E. O. WILLIAMS spoke of the principles of investigation of an outbreak of hospital infection. Sepsis should be routinely recorded, and the outbreak considered epidemiologically, bacteriologically (including assessment of the serotypes or phage-types involved), and hygienically: thus if one type only was involved there was likely to be a single source, but if there was more than one type there might be some general or specific lowering of aseptic standards. Phage-group I was common in maternity units and group III in surgical wards.

Dr. B. R. FRISBY (Oxford) described two outbreaks of staphylococcal diarrhœa; these involved 31 patients (of whom 14 died) including 14 who had undergone gastrectomy (of whom 7 died). All had had antibiotics, but only 5 had had broad-spectrum antibiotics. The onset and course were rapid, with rice-water stools and collapse. Pathogenic staphylococci were found all over the ward, which was quickly infected by a single patient. Dr. Frisby recommended that antibiotics should be given to surgical patients only when there was a definite indication, and then the patient should be isolated; side-wards were ineffective for this.

Dr. E. J. LOWBURY (Birmingham) agreed that staphylococci of phage-group III predominated in burns, and wondered whether the decreased incidence of streptococcal infection was due to a reduced virulence of the organism. Dr. FRISBY said that 1 case of staphylococcal diarrhœa had followed neomycin therapy, and that in his cases smears of the stools were loaded with staphylococci, indicating that these probably caused the diarrhœa and were not an incidental finding. 6 patients had responded to erythromycin. Dr. O. M. LIDWELL spoke of the advantages and drawbacks of various methods of ventilation, and Prof. J. W. HOWIE (Glasgow) said that an inefficient steriliser was worse than useless, for it could concentrate polluted air.

Theatre Infections

Dr. R. A. SHOOTER gave an account of the sharp drop in wound sepsis (9% to 1%) when the ventilating system of an operating-theatre was changed so that air was no longer sucked in. It was useful to have a brisk horizontal flow of air over the table.

Dr. R. BLOWERS (Middlesbrough) said that a wound could be assumed to have been infected at operation if sepsis quickly followed, if there was deep but not superficial sepsis, or if infection was persistently associated with the presence of a certain person in the theatre. Experiments with a slit-sampler had shown that the contamination of air could be reduced greatly if movement in the theatre was restricted to the minimum necessary; if the patient was put in position on the table before he was brought into the theatre; if everyone in the theatre wore proper clothing; and if blankets were not used. In half the septic wounds the same organism was present on the patient's skin; more attention might be paid to its sterilisation.

Dr. D. B. MOORE (Exeter) said that long operations and self-retaining catheters predisposed to wound infection. There was a higher incidence of infection with virulent staphylococci if an "umbrella" of antibiotics was used.

Dr. W. A. GILLESPIE (Bristol) said that after 1081 operations there had been 85 staphylococcal infections; it was thought that 19 had originated in the theatre and 55 in the ward. Staphylococcal wound infections arising in the ward were often due to phage-group III, and furunculosis to phage-group I which was found in the nurses' noses.

Ward Infections

Dr. LOWBURY spoke of burns. He said that primary excision and grafting was the best prophylactic measure against infection. When grafting must be delayed, infection could be reduced by dressing burns in an air-conditioned room using a no-touch technique, and by using chemotherapeutic creams. If *Streptococcus pyogenes* appeared, specific chemotherapy should be given. The exposure method probably did not protect burns against contamination.

Dr. JANET JELLARD said that in nurseries the babies, which were often handled without gloves and with inadequate hand-washing, were the chief reservoir for infection. The umbilical cord was especially dangerous and should be either covered or treated with an antiseptic.

Dr. E. S. DUTHIE (Southampton) described an outbreak of infection due to phage-type-80 staphylococcus in two general hospitals in the same group. There were infections of the skin, eyes, wounds, bedsores, and urinary tract, and bronchopneumonia, but no enteritis. He agreed that babies were a reservoir of infection, and had found that prompt isolation of infected patients and staff was helpful, and that reducing the number of nasal carriers and the dust content had some effect.

Dr. J. D. A. GRAY said that strict attention to cleanliness and asepsis in nurseries was essential. Many staphylococcal infections, though resistant to other drugs, were sensitive to chloramphenicol and erythromycin; eye infection responded to sulphonamides and cord infection to gentian-violet. Streptococci might survive penicillin treatment because of coexistent penicillinase-producing staphylococci. Dr. J. G. P. HUTCHISON (Newcastle upon Tyne) agreed with previous speakers that babies are the culture medium, infecting their mothers and other patients. Dr. M. H. GLEESON-WHITE (Cambridge) mentioned 15 cases of rapidly fatal hæmorrhagic staphylococcal bronchopneumonia. All of them had probably had pulmonary œdema.

Investigation and Control

Dr. WILLIAMS listed the steps in the investigation of an outbreak. These included keeping a theatre and a ward book recording all infections, and watching ward and theatre techniques as they were carried out in practice.

Prof. RONALD HARE described experiments showing that nasal carriers produced air contamination owing to infection of the skin and clothes; movement, dressing, washing, &c., spread the organisms more than did sneezing or talking. A few carriers contaminated the air much more than the rest.

Dr. J. C. GOULD (Edinburgh) spoke of methods of reducing contamination by carriers. Creams containing common antibiotics such as penicillin and tetracycline were the most effective in eliminating staphylococci from the nose; but these had drawbacks, and a mixture of neomycin or bacitracin and chlorhexidine ('Hibitane') was almost as effective. In practice such creams reduced the incidence of auto-infection and cross-infection.

Dr. BLOWERS emphasised that laundering did not sterilise blankets, but heat sterilisation ruined them. Woollen blankets could be sterilised about twenty times by a quaternary ammonium rinse after laundering. He showed three experimental blankets that could be boiled; they were made of terylene, turkish-towelling, and a cotton weave, and were respectively much more, a little more, and less expensive than woollen ones.

Dr. H. B. MAY spoke of the administrative aspects. He said that one consultant in each hospital should concern himself with all hospital infections there. All infections should be notified to him by the ward sisters. He should investigate infections and advise on prevention and treatment. The infected patient cost half as much again as the uninfected patient.

Dr. MARY BARBER said that staphylococci in pus were probably more virulent than those in the noses of carriers; it was therefore important to separate septic surgical patients in wards and operating-theatres. Dr. H. G. H. RICHARDS (Winchester) said that hospital overcrowding predisposed to infection and that more and better hospitals were needed.

GASTRO-ENTEROLOGY

A CONFERENCE on gastro-enterology, under the auspices of the Postgraduate Education Committee of the University of Glasgow and of the Royal Faculty of Physicians and Surgeons, was held on Nov. 26–30.

Treatment of Ulcerative Colitis

Dr. S. C. TRUELOVE (Oxford) said that in the treatment of ulcerative colitis the correction of fluid and electrolyte depletion, particularly that of potassium, was important. Blood-transfusion and administration of cyanocobalamin (vitamin B_{12}) or folic acid were valuable; oral iron should be avoided. The diet should have a high protein and calorie content; in those with anorexia, a fortified intragastric milk drip was given at night. Either cortisone, prednisolone, or corticotrophin could be given, and oral cortisone could be combined with the daily instillation by rectal drip of hydrocortisone. Colonic dispersal by this route had been found satisfactory, and there were rapid remissions in many cases. Antibiotics reduced the risk of pyogenic complications, and propantheline relieved abdominal pain.

Dr. W. I. CARD (Edinburgh) emphasised the considerable protein loss and the intensive replacement needed. Surgery should be avoided during the acute phase: if it were needed cortisone should be discontinued. In surgical treatment Prof. J. C. GOLIGHER (Leeds) opted for primary colectomy with permanent ileostomy. Occasionally, irritation of the adjacent skin or stenosis of the stoma followed. Mr. A. B. KERR recommended primary ileostomy in some cases, with colectomy later. The ileostomy bag need not be adhesive. Dr. BERNARD LENNOX said that biopsy of colonic mucosa was valuable in investigating the disease. Often large areas of mucosa were shed; this loss was irreparable and influenced the results purely medical measures.

Peptic Ulcer

According to Mr. R. A. JAMIESON, the true prevalence of peptic ulcer in this country was about 10% for men and 3% for women. These figures were based on post-mortem series. Mr. D. H. CLARK said that before puberty boys and girls had an equal incidence of peptic ulcer, but after puberty ulcer was many times more common in males. 90% of women had a remission of ulcer symptoms during pregnancy, but symptoms always recurred. Onset or aggravation of symptoms was common at the menopause.

Dr. A. R. CURRIE drew attention to the association of peptic ulcer with islet-cell tumours of the pancreas. The risk of malignancy in gastric ulcers was probably less than had previously been believed; it was estimated that only 4% of gastric cancers routinely examined had arisen from chronic peptic ulcers.

Prof. T. F. RODGER said that in many cases the onset of symptoms was associated with emotional upset. Studies in the United States suggested that ulcer patients had intense unconscious dependency wishes. An "ulcer type" was no longer recognised.

Dr. L. D. W. SCOTT suggested that the association between peptic ulcer and coronary-artery disease might be explained by the customary high-fat diet of ulcer patients. Of 110 men admitted to his wards with myocardial infarction, 20 (18%) had peptic ulcers; of 89 controls with bronchial carcinoma 8 (9%) had ulcers.

Dr. S. LAZARUS said that rest in bed was the most important single factor in medical care and increased the rate of healing of both gastric and duodenal ulcers; it was more valuable in hospital than at home. Diet, milk drips, and drugs might relieve symptoms, but did not seem to influence the rate of healing of an ulcer.

Mr. A. P. M. FORREST said that, in view of the risk of malignancy, gastrectomy should always be performed for gastric ulcer. In duodenal ulcer an attack on the acid-producing mechanism was essential. Gastrectomy was probably still the treatment of choice, but where it was inadvisable (as in the patient with pulmonary tuberculosis, the female, the poor risk, and where it was technically hazardous) vagotomy, with pyloroplasty or gastro-enterostomy, was suitable. In gastric ulcer the Billroth-I gastrectomy was preferable; but in duodenal ulcer it carried a high rate of recurrence, and a Polya reconstruction was advisable.

Mr. W. T. IRVINE said that patients in the fourth and fifth decades were particularly liable to develop stomal ulcer. This was a complication of gastric operations only when they were performed for peptic ulcer; it might appear many years after gastro-enterostomy but usually within three years after gastrectomy. These ulcers had a particular tendency to penetrate. Marginal ulceration following gastro-enterostomy was treated by gastric resection and reconstitution of the jejunum involved in the anastomosis; but for recurrent ulcer after gastrectomy a higher resection was usually the treatment of choice. Vagotomy might help patients in this group.

The post-gastrectomy syndromes were described by Mr. A. N. SMITH. Their incidence was directly proportional to the amount of stomach removed. The small capacity of the gastric remnant, increased rate of gastric emptying, reflux into the afferent loop, hypoglycæmia, jejunal distension, osmotic influences, alterations in blood-volume, and disturbance of acid-base balance had all been cited as possible causes of these syndromes. He advocated a high-protein and high-carbohydrate diet and eating meals dry; soups should be forbidden. Potassium citrate, local anæsthesia, and ganglion blockers might relieve symptoms; in severe cases conversion to Billroth-I gastrectomy gave good results.

Mr. A. W. KAY discussed the management of bleeding peptic ulcers and suggested that they were, in the first instance, amenable to medical treatment. Operation was rarely advised for the initial bleeding, when the mortality was low, or for the long-term recurrence which in all respects resembled an initial hæmorrhage. On the other hand, surgery should always be considered in patients over the age of 50, as in this group the mortality rose steeply, or when there was a history of a chronic ulcer, particularly if this was gastric. An acute ulcer was unlikely to cause fatal bleeding. Surgery was undoubtedly required where there was continuing or rapidly recurring hæmorrhage, where there were added complications of the ulcer (perforation or stenosis), or where pain persisted after the initial bleeding. At operation the presence of blood in the gastric aspirate and the level of blood in the gut were guides to the site of bleeding. If no ulcer was palpable or visible and the bleeding was coming from the stomach, an acute ulcer was the most likely source. The presence of an enlarged lymph-node at the origin of the left gastric artery was suggestive of a gastric ulcer. If no source of bleeding was apparent the stomach was not to be opened but a blind gastrectomy performed. If examination of the excised specimen did not reveal the lesion causing the bleeding the gastric remnant was inspected and any lesion dealt with.

Treatment of Carcinoma of Colon

Professor GOLIGHER said one would expect to save half the patients with carcinoma of the rectum. Three-quarters of the cases seen were operable. Local fixation of the growth, as estimated on rectal examination, was a completely untrustworthy sign of inoperability. Palliative resection should be performed wherever possible; $1^1/_2$–2 years of comfortable life might be obtained by the patient with liver metastases. For growths below the peritoneal reflexion, abdominoperineal resection was indicated. If the growth was in the upper third of the rectum, low anterior resection gave as good results and maintained a continent anus. Lesions here would be more than 10 cm. from the anal verge on sigmoidoscopy and just within reach of the palpating finger. The only certain sign that the blood-supply to the anastomosis was adequate was arterial bleeding in the cut mesocolon or bowel. If there was doubt as to the integrity of the anastomosis, a temporary transverse colostomy was advisable; an extraperitoneal drain was left in place for 7–8 days. In acute obstruction due to cancer of the right colon, immediate resection and anastomosis was usually possible; if the ileocæcal valve was incompetent and the ileum distended it should be decompressed by catheter. In obstructing lesions of the left colon, either transverse colostomy or cæcostomy would relieve the obstruction. In obstructing lesions of the transverse colon, the colostomy should be placed next to the growth, for the cancer and colostomy could be simultaneously excised later.

Mr. KERR said that, as cancer of the rectum rarely led to obstruction, a palliative colostomy should never be performed. Radiotherapy was beneficial for perineal recurrence.

Gastro-intestinal Hormones

Dr. CARD said that the evidence for the presence of humoral factors in the intestinal tract of man was not good. It was now possible to localise accurately and study the cells of origin of a hormone, by administering the appropriate antihormone, which caused a reaction in those cells. The blood-supply to the stomach was enormous; 50 volumes of blood was required to produce 1 volume of 0·16 *M* HCl. 0·004 μg. of histamine per kg. body-weight per hour (a dose well within the physiological range) by constant intravenous infusion could induce acid gastric secretion. He believed that gastrin was a histamine-liberator. The use of secretin was well established in the diagnosis of pancreatic disorders. In relapsing pancreatitis the administration of morphine with secretin prevented a flow of pancreatic juice and reproduced the pain. After sphincterotomy the test gave a good flow of pancreatic juice and no pain. Recent reports had suggested that pancreozymin contained a gall-bladder-contracting substance. Fat in the duodenum inhibited gastric motility and secretion by release of the hormone enterogastrone, which inhibited all types of gastric secretion and protected dogs against the development of peptic ulcer after the Mann-Williamson operation. Urogastrone, the excretory product of enterogastrone, was known to inhibit histamine and induce gastric secretion in man.

Mr. H. I. TANKEL suggested that histamine could stimulate pancreatic secretion—an effect blocked by atropine. Mr. SMITH presented data which demonstrated that extracted gastrin liberated histamine in all tissues.

In England Now

A Running Commentary by Peripatetic Correspondents

Now that the well-informed have disposed of the *Times's* Christmas tests of knowledge, they may care to try the menu of last Saturday's medical banquet in Amsterdam. The outside presented few difficulties:

Singulæ Dapes (it said) appositae in Epulis Sollemnibus Nonis Ianuariis MCMLVII propter Ephemeridem Neerlandicam pro Medicina centum annos vigentem.

But now we came to the essentials:

Promulsis cum cancro

Ius testudinis in calice

Vinum ex vinea aulica Wehlenensi MCMLIII

Summa solea more Archimagiri
Solana tuberosa Britanno modo

Phasianus assus
Brassica salita ornata
Poma cocta mixta

Vinum ex vinea Beinæ MCMLIII

Casei selecti

Placenta ex ovis cocta, glacie sub spuma latente

Vinum spumans siccum (Perrier Jouet)

It was about 20 to 1 when we adjourned for

Cafœum
Coniacum et liquores

feeling that the evening had been well begun.

* * *

Not far from the American border in this part of the world there used to be a place called Fort Whoop Up where American whisky traders ran trading-posts to sell liquor to Indians in Canada. This led to such lawlessness that a body of men known as the North West Mounted Police established itself in the same area under Colonel McLeod at a place that has become the town of Fort McLeod. Fort Whoop Up is now nothing but a Historic Site.

Times change. The N.W.M.P. has become the R.C.M.P. The provincial government has established trading-posts known as government liquor stores where any man who pays fifty cents for a permit can go and buy as much hard liquor as he likes, provided he pays for it and is not Indian. Gasoline in abundance from local oil-wells provides power to drive cars at high speeds, faster than the fastest horses of the days of Fort Whoop Up. By these means many casualties enter hospitals, and some go to the funeral parlours. Many cars are wrecked, and prosecutions for "impaired" driving bring revenue to the government in addition to the profit from the liquor stores and the gasoline tax.

This whooping-it-up state of affairs is mildly endemic throughout the year, but about Christmas and New Year it used to become epidemic, until a few years ago, when the Alberta Safety Council began to deal with it prophylactically. The council is helped by the newspapers and radio stations and their advertisers, commercial firms, motoring organisations, and the city police in Calgary. Here cars may be seen bearing curious bumper legends, such as "Drive like Lightning: Crash like Thunder." Another jingle of the campaign is, "Stay Alert, Stay Alive, Make it Coffee when you drive." Badges distributed to truck-drivers bear the motto, "No thanks, I drive a truck." A distillery advertises that, "Men who think of Tomorrow practise Moderation Today."

The culmination of the campaign is at the peak of the epidemic. In Calgary since 1950 the police will, by request, drive you home on Christmas Eve and New Year's Eve if you lack sobriety but retain wisdom. The too convivial driver will be driven home, and his car will be driven home too if there is somebody to take charge of the keys. Otherwise the car will be parked overnight and may be claimed when the owner recovers. This duty is undertaken by unpaid volunteers of the police department, and no charge is made for their services. It is strictly understood that their attitude is one of sympathetic assistance, and that no action will be taken against the driver who asks for help and doesn't drive. But the most awful penalties are promised to him who is found to be "impaired" and driving. The year this service was started the number of accidents over Christmas and the New Year fell from 65 to 13 and has never risen above 12 since. Calgary's methods may be unorthodox but they seem to be effective.

* * *

Singing at work must be as old as man. The Hebridean woman churning milk, the Negro slave chopping wood, the sailor hauling in the mains'l, and the boatman with his Volga boat, were all employed in monotonous physical tasks rendered tolerable and even pleasurable by a sort of mass hypnosis. A happy custom and we are the worse for losing this capacity to burst into an appropriate lyric when about our everyday chores. It is good news, therefore, that a Cobbleigh Committee is sitting at Widdicombe-in-the-Moor to select occupational songs for the medical profession.

Two Lovely Black Eyes is suggested for casualty officers, and *Dry Bones* for orthopædic surgeons. Cardiologists will trill *Boom, Why Does my Heart Go Boom* in close harmony between patients, and pædiatricians will take readily to *Sleep, Baby, Sleep.* This song was put forward first for anæsthetists, but *Two Sleepy People* was felt to be more appropriate. Of contemporary songs, *Shake Rattle and Roll* might suit the physiotherapists, and *Rock Around the Clock* the maternity department. The committee is not neglecting the Greater Medical Profession: medical statisticians will have the first 99 verses of *One Man Went to Mow*, and hospital administrators and home sister *You Can't do That There 'Ere.* For the rest of the nurses *Tea for Two* is suggested. For psycho-analysts there was a wide range of choice. *My Dreams are Getting Better all the Time* was considered, but in the end the committee recommended the old song that goes *We've Been Together Now for Forty Years, and it Don't Seem a Day Too Much.*

* * *

The Medical Superintendent had thrown a Christmas party and was gazing out of the window with pride at a gigantic fir tree in the grounds which was blazing with coloured lamps. A visiting psychiatrist clapped him on the shoulder.

"I say, old boy, that's a terrific show; how did you get the lamps?"

"Oh, they are just replacements from the stores and we got the depressives to spray them with lacquer."

"Yes, but who foots the bill for the extra current?"

"There isn't any."

"How come?"

"Oh, we just replaced all the hundred-watt bulbs in the nurses' home with twenty-fives."

* * *

I believe an ancient word for physician meant "one who knows urine," and many old pictures of the physician show him holding up a vessel of urine to the light. My old chief used to start his round in the side-room where the urines of all his patients were displayed in conical glasses. All this seems to have gone now and urine has become a rare commodity. Nurses are tidier than ever and all specimens are sent quickly to the path. lab. or sluiced away. I no longer see urine but only typewritten slips of paper describing it.

* * *

I was driving along a quiet country lane on my morning round when a small car, driven by a woman, shot out of a side turning and came to a sudden stop alongside me. She gesticulated wildly and shouted "Pig." I was somewhat taken aback at this and, feeling much aggrieved, I wound down my own window, shouted "And pig to you," slammed into gear, and drove round the corner, where, wandering in the road, was the largest pig I'd ever seen.

* * *

One of my junior colleagues preferred to avoid the contacts and the accuracy involved in claiming mileage. Now "they" won't give him petrol coupons. I have been trying to push his case, but . . .

Fabius Cunctator
Sired my
Administrator.

Letters to the Editor

FUTURE OF NURSING

SIR,—I should like to give complete support to Dr. Ritchie Russell (Dec. 15). The statement of policy from the Royal College of Nursing must surely have been formulated after a study of the report of the Nuffield Provincial Hospitals' Trust on "The Work of Nurses in Hospital Wards" (1953), yet its aims are in many ways out of harmony with this. The report pointed out that those State-registered nurses who remain in the hospitals spend their time in the main watching student nurses do the actual work. And it is generally well known that few S.R.N.s do in fact devote themselves ultimately to the techniques of nursing.

The new proposals seem to increase these tendencies, so that one may justifiably ask what will be the object of becoming a trained nurse.

Anyone who has recently visited hospitals in the United States will have noticed the *reductio ad absurdum* which the craving of nurses for academic status has created in that country. In hospitals other than those staffed by nuns, the graduate nurses in charge of beds tend to sit majestically at desks outside their wards, doing the "office work" and making critical (though often pertinent) comments on such matters as the blood chemistry of their patients. The real nursing is done either by orderlies or by the patients' relatives.

In medicine the aim of most of us in qualifying is to practise our craft; very few of us become medical administrators or devote ourselves wholly to teaching. So should it be in nursing.

Finally, if the nurses and the doctors are in the future to belong to parallel services, what is to be the fate of the patient? Whose will be the ultimate responsibility for his care? Many of us have noticed with concern a growing lack of acceptance by senior members of the nursing profession that they belong to an auxiliary service which must be subordinate to the doctors, and which cannot possibly have an independent existence. If the Royal College of Nursing made public acknowledgment of this fact, and used its influence to ensure that nurses in training are given the same opportunity to live their personal lives as is accorded to students in other spheres, nursing would have no lack of recruits.

Radcliffe Infirmary,
Oxford. RONALD MACBETH.

SIR,—I would like to endorse the views put forward by Professor Vining and Mr. Brian Watkin (Dec. 29), and also to thank Professor Vining for his admirable statement of the complex range of duties for which nurses must now be trained.

A further point which might be emphasised is the numerical importance of nurses in the National Health Service. It must be recognised that senior members of the nursing staff, in both hospital and public-health services, generally carry direct responsibility for the work of a greater number of people than the senior officer in any other section of the services. Unless these leaders have good intelligence, a sound knowledge of the principles of administration, and the wisdom to deal with a wide range of human problems, wastage will be severely aggravated.

The age of entry into training needs further consideration; but, although it seems necessary to establish a minimum, should this be chronological age alone? The patient, male or female, expects from the nurse a maternal attitude, and this is developed by girls at varying ages. Some girls of 17 are more mature than others of 19. If an accurate assessment of maturity could be made, this would be more important than age in years.

The pressing problem of the status of the State-enrolled assistant nurse urgently demands attention, and perhaps the easiest step towards improvement would be a change in title to "State-enrolled nurse." It is regrettable that the Royal College of Nursing, in its otherwise valuable statement on policy, has not recognised the need for promotion. Team-work would offer more interesting duties to the S.E.A.N.; but would this alone be sufficient to attract recruits in the numbers we require? Ambitions may well soar higher than providing "a much needed stable element in the team." Is there any reason why experienced assistant nurses should not become ward sisters in certain fields, particularly that of geriatrics, in which their reputation is so firmly established? They should be, at least, as good as the inexperienced and sometimes inadequately trained State-registered nurse.

Lastly, with regard to the vexed question of "common entry" versus two types of training, is Dr. Ritchie Russell not aware of the generally accepted principle that students of widely different intellectual ability cannot be taught together? If they could, the 11+ examination and A, B, and C streams in the schools would be superfluous. If it is agreed that nursing has room for women of different levels of intelligence and academic ability it is surely reasonable to accept two streams, or types of training.

I would like to allay some of Professor Vining's fears about picking "'high ups' at the start of training." Certainly a university course should not be a passport to high office. It should only give a better preparation for leadership to the candidate who also develops the qualities of mind, personality, and character needed by the leader. It may also be hoped that some of those who would have the advantage of a university course would choose to remain in the field, in close contact with patients, just as some of our most able members today remain as ward sisters, health visitors, and district nurses, instead of stepping into administration. The influence of these women who have the ability for senior appointments, but choose the more practical aspects of nursing work, cannot be overestimated.

Leeds. JOYCE M. AKESTER.

SIR,—We have long advocated a scheme of training like that suggested by Dr. Ritchie Russell. Its purpose is to encourage recruitment and to avoid on the one hand the wastage due to inability to pass the State examinations and on the other the alleged frustration of the more intellectual candidate.

The assistant-nurse scheme recognises and has proved the value of the "ordinary nurse," and it is surely absurd to speak of downgrading a nurse's status by teaching her the basic technique of nursing. We consider that the minimum age of entry for hospital training should be reduced to 17, that candidates must have reached a reasonable standard of general education, and that the present assistant-nurse training and "assessment" should be taken by all candidates, and should lead to qualification as a "State-registered assistant nurse." No difficulty should attach to postponement of the assessment in the case of the slower candidates, nor should there be any slur upon those who continue for the rest of their lives in this grade. There should, however, be a grade of "senior assistant nurse," with higher pay, obtainable by promotion by those who have served for say ten years in a hospital.

During the two years of basic training it will have become evident which nurses are fitted for advanced training. These candidates, who should possess the General Certificate of Education or equivalent general educational qualification, should proceed to a third year of training and to an examination in the theory and practice of nursing to enable them to qualify as "State-registered nurses." This training, in our opinion, should include a course in pharmacology, and State-registered nurses should have the same duty as the pharmacist to question dosage. No-one should become a hospital staff nurse without this qualification, and no-one should be appointed sister who has not had a minimum experience of one year as a staff nurse in either a general or a special hospital.

For those of academic ability and inclination there is already a diploma of nursing obtainable at London

University. This might be taken by aspirants to teaching or higher administrative posts. Nursing, in our view, is a subject totally inappropriate to a university curriculum leading to a degree.

G. M. WAUCHOPE
C. M. OTTLEY.

Hove, Sussex.

SIR,—Lest Dr. Thomas Anderson should again be disappointed, I hasten to write in support of his letter of last week.

For many years I have been personally concerned with the teaching and training of nurses in two very large mental-deficiency hospitals. During that period I have seen the standard of nursing raised considerably, only to fall again. The General Nursing Council are now the only examining body for mental nurses, and the preliminary examination of that body is quite inadequately related to the experience which a first-year student nurse gains in the wards. The syllabus for that examination makes no mention of the nature of mental illness, or of mental defect, of the special needs of such patients, or of the reasons for the special methods used in nursing them. On the other hand, the academic level required in anatomy, physiology, communal health, and bacteriology has been steadily raised.

The number of female nurses who complete their training as mental or mental-deficiency nurses is quite inadequate, and the proportion of trained nurses has fallen to a dangerously low level.

The Ministry of Health is now pushing forward a scheme for the instruction of "nursing assistants"—clearly with a view to introducing a grade in mental nursing corresponding to the State-enrolled assistant nurse. The inefficient handling of mental patients can produce results which are very serious for the patient, and which raise serious difficulties in administration. This official attempt to perpetuate the present shortage of trained staff can only result in a lowering of the standards of care and treatment available for mental patients.

Like Dr. Anderson, I take the view that it is our duty, as the doctors responsible for the care of these patients, to protest, and to do whatever we can to impress upon the Minister of Health that nurses must work under the direction of doctors, and that senior medical staff in every branch of medicine should have a much greater influence in prescribing the standards of training and examination of the nurses who have the immediate care of patients.

In conclusion, may I underline one of Dr. Anderson's points? What our hospitals need are far more ordinary nurses—i.e., staff nurses, trained to undertake the routine care of patients efficiently. From their ranks will emerge those capable, after further training, of accepting the responsibilities of the higher nursing posts.

Brockhall,
Langho, near Blackburn. D. J. ROSE.

X RAYS AND LEUKÆMIA

SIR,—We appreciate the way in which Dr. Rabinowitch (Dec. 15) has clearly depicted the fundamental issue at stake—that is, whether there is a threshold dose of radiation below which leukæmia in man is not induced. Dr. Rabinowitch weighs the evidence and concludes that such a threshold is likely to exist and that it may lie between 100 and 200r; in our view the present evidence is insufficient to justify this belief.

The principal weakness in Dr. Rabinowitch's argument is that he has not adequately taken into account the very large numbers of persons who need to be studied in order to establish the presence or absence of an effect from doses of radiation as low as those that may be received during the course of diagnostic radiology. Thus, on the assumption of a simple proportional relationship between dose and effect, a reasonable estimate is that a dose of 1r averaged over the red bone-marrow of the whole body would cause about 1 case of leukæmia annually in a population of 1,000,000 people. Bearing in mind that in the general population, aged 15 years and over, the incidence of leukæmia is approximately 50 cases per 1,000,000 persons per year, it can be shown that about 20,000,000 persons, each exposed to a mean marrow dose of 1r in excess of that received by the general population, would probably have to be observed for a period of ten years before the excess of cases could be recognised. If the average marrow-dose were about 20r, a population as large as about 50,000 persons would need to be observed for the same period. Even the latter project would be formidable but it is not impossible; and we must face the fact that if this important problem is to be solved, projects may well have to be mounted on this scale.

It is not perhaps generally realised that similar limiting conditions have also been found in the investigation of the incidence of radiation-induced gene mutations. According to Muller, the lowest radiation dose level at which it has been possible to observe the excess of lethals resulting from the irradiation of drosophila sperm is 25r.[1] Nevertheless, above this level the form of the relationship between dose and response is such that geneticists have postulated with considerable confidence that no threshold dose exists for the induction of gene mutations, and this postulate has been accepted in practice.

With regard to Dr. Rabinowitch's specific arguments, we would make the following comments:

(1) It is not, to us, surprising that none of the children of the 205 women who were pregnant when they were exposed to the atomic explosion at Hiroshima have developed leukæmia. In fact only 4 of the mothers were exposed at distances of under 1000 metres and 145 were 2000 metres or more from the hypocentre. From data published by the United States authorities,[2] estimates can be made of the doses of prompt γ-radiation that would have been received by persons standing unprotected in the open at varying distances from the point of explosion. These suggest that the dose at 1000 metres would be not less than 1400r and at over 2000 metres it would be not more than about 8r.[3] The dose resulting from such fallout as occurred in Hiroshima is not likely to have increased the total doses substantially above those resulting from the prompt radiation. The fact that the women exposed at less than 1000 metres survived, indicates that they must have been heavily shielded from irradiation, presumably by buildings, as a dose of 1400r to the whole body would cause acute radiation death in all persons. Many, if not all, of the mothers exposed at greater distances would also have been shielded to some extent, so that on average these mothers, even those 2000 metres or more from the hypocentre, will have received appreciably smaller doses than those estimated above. While, therefore, all these mothers, and their children, may have suffered some increase in their probability of developing leukæmia, it is our view that the population exposed was far too small, relative to the doses received, for it to be likely that even one case of leukæmia would have been subsequently observed either amongst the mothers or their children.

(2) With regard to the general incidence of leukæmia among survivors in Hiroshima and Nagasaki, Dr. Rabinowitch argues that no increase has occurred among persons exposed beyond 2000 metres and that doses of between 100 and 200r must have been received at this distance since many instances of "radiation sickness" have been reported. Like many others interested in the problem, we believe that such reports of radiation sickness should be treated with reserve. It has already been pointed out that the available physical data suggest that survivors exposed at more than 2000 metres received doses

1. Muller, H. J. Radiation Biology. New York, 1954; p. 476.
2. Effects of Atomic Weapons. New York, 1950.
3. Medical Research Council Report. Cmd. 9780. H.M. Stationery Office, 1956; p. 15.

of not more than about 8r of prompt γ-radiation, and radiotherapeutic experience shows that whole-body doses of X rays of this order do not cause radiation sickness. The most likely explanation of the reported instances of "radiation sickness" is that a feeling of malaise with some nausea, and even frank vomiting and diarrhœa, may occur in anyone subjected to sufficient physical and emotional stress. However, the data on the ratio of the observed number of cases of leukæmia to the expected number at varying distances from the hypocentre among Hiroshima survivors show that there is, in fact, a steady fall from about 100 to 1 for those exposed at less than 1000 metres to about 1·5 to 1 for those between 2000 and 3000 metres and that the ratio is still above 1 to 1 (i.e., 1·2 to 1) for those over 3000 metres.[4] The numbers of cases are, however, too small to be able to conclude that the incidence has definitely been increased at these two latter distances. The populations of survivors are estimated to be 30,350 and 37,350 persons respectively, and the data refer to an eight-year period of observation. As has already been pointed out, a population of 50,000 persons exposed to a mean marrow dose of as much as 20r may well have to be observed for a period of ten years before any significant excess of cases of leukæmia can be recognised.

(3) Dr. Rabinowitch quotes our own preliminary data on the incidence of leukæmia in 13,352 patients treated with X rays for ankylosing spondylitis,[5] and points out that, whereas 35 cases of leukæmia were found in those patients who had received a maximum dose in the spinal marrow of 500r or more, only 2 were found among those who had received doses of less than 500r. These data, however, should not be taken as evidence in favour of a threshold effect; for, if they are taken at their face value, it must be concluded that the number of cases observed at each level of dose is, in relation to the number of patients exposed, proportional to the dose received and hence the data tend rather to support the hypothesis that no threshold dose exists.

(4) The data on radiation-induced leukæmia in animals are complex and the conclusions based on them can be applied to humans only with the greatest caution—if at all. In the first place, there exist considerable species differences in susceptibility, and leukæmia is less easily induced in the dog, the guineapig, or the rat than it is in the mouse. There now seems little doubt that man has a higher sensitivity to the induction of leukæmia than many other mammals. Secondly, most animal observations have been made on mice, and Furth and Upton and other writers have now shown that in this animal 3 different forms of leukæmia may be induced—a thymic lymphoma, a non-thymic lymphoma, and a myeloid leukæmia. The facility with which these various tumours are induced seems to depend on several factors apart from radiation, such as the breed of mouse, sex, age at the time of irradiation, hormonal state, &c. Certainly, Furth and Upton did report that the combined incidence of both types of lymphoma in untreated ageing RF male mice was about equal to that in their group of male mice exposed to neutron irradiation, up to biologically equivalent doses of about 500r[6]; but it is probably unwise to generalise from such observations to man—particularly since Furth and Upton reported an increase of myeloid leukæmia in their irradiated animals, and human radiation-induced leukæmias are mainly of this variety. Thirdly, it is only within the last year that the problem of the incidence of leukæmia in relation to low levels of radiation has assumed such importance. Published animal experiments have not been designed to investigate this particular point; if they had been, the experimental designs would have been different and the numbers of animals used much greater.

In conclusion, we should like to point out that leukæmia is only one of the delayed effects of irradiation. It so happens that to date most attention has been paid to this effect, but there are undoubtedly others such as the production of other tumours, and there is also the possibility that there may be a general effect on the expectation of life, to which attention has been recently drawn by Shields Warren.[7] Such effects may be additive, and the total risk run by a given individual after a given radiation dose will presumably not be fully described by his enhanced risk of developing leukæmia. But whether it is proper to extrapolate from existing data and to estimate quantitatively the size of the very small effect to be anticipated with the low doses used in diagnostic radiology is uncertain. It is evident that, in this era when the medical and industrial uses of atomic energy are expanding so rapidly, it is of basic importance to determine whether threshold doses for the induction of these delayed somatic effects exist.

Group for Research into the General Effects of Radiation, Radiotherapy Institute, Western General Hospital, Edinburgh.

W. M. COURT BROWN
RICHARD DOLL.

4. Court Brown, W. M., Doll, R. *Ibid*, p. 84.
5. *Ibid*, p. 87.
6. Furth, J., Upton, A. C. Leukæmia Research. London, 1954; p. 146.

HEAD INJURIES

SIR,—One has reason to believe that 80% of casualty cases are first seen at non-teaching hospitals,[8] and that most of these hospitals are faced with the problems outlined in your leader of Dec. 22. It is, in fact, a great credit to the casualty departments in this country that the mishaps you refer to are so few, when there is no clear policy that I have ever heard of for the disposal of head-injury cases brought in the first instance to outlying hospitals. I have puzzled over it for many years and am little further on than when I started. The only course one can adopt is to admit everything one possibly can and to hope that the inevitable piece of bad luck will land on some other hospital's doorstep.

In deciding what to send on to the neurosurgical centre the situation is little better. One cannot, in all fairness, send everything, and one seldom knows what proportion of those sent have profited by it. I do not believe one should send head injuries merely because they are severe. It may be, as we are told by the neurosurgeons, that patients with head injuries travel well; but many are moribund when they are first seen, and it is wrong that someone who is going to die should do so in an ambulance or soon after admission to a strange and sometimes distant hospital. Not only is it wrong, but it may be said that the transfer precipitated the fatality, and it is hard to hold to a theoretical opinion in the face of an individual tragedy. The casualty officer or the inpatient emergency surgeon is often faced with a dilemma—to risk the upset of these mishaps, or to hold onto a case which might profit by prompt transfer. I find it very difficult to give a confident prognosis soon after a severe head injury, and the silent extradural hæmorrhage can deceive anyone. Moreover, clinical judgment must be tempered by knowledge of transport and other resources, because the disposal of accident cases is almost as much a geographical problem as a surgical one. (My suggestions for improvement in this direction have been described as "semi-military,"[9] but I do not know if this was intended as half a compliment or half a criticism.)

The present development seems to be to put small neurosurgical "metastases" from the regional centres into suitable peripheral hospitals, as soon as the multiplication of neurosurgeons is adequate to staff them. But how far is this to go? Do we aim at a head-injury unit at every crossroads, and if so, how much will it cost and how long must we wait to get it?

It would, to my mind, be much more sensible, as well as much less expensive, to integrate and educate the resources at present available for selecting these cases, and for carrying out such preliminary treatment as will help any later specialised procedures. They are admitted

7. Warren, S. *J. Amer. med. Ass.* 1956, **162**, 464.
8. Lowden, T. G. *Lancet*, 1956, i, 955.
9. Capener, N. *Ibid*, 1956, ii, 92.

to *our* wards or seen in *our* casualty-rooms. We want to know, more precisely than we do at present, what type of case need not be transferred, what type it is useless to transfer, and, most particularly of all, what should guide us in deciding whether to send a case on, to ask a neurosurgeon out to see it, or to get on with it ourselves.

Neurosurgical units are busy, progressive institutions, but a new operation for cerebrospinal rhinorrhœa, or a post-mortem report on ruptured œsophagus (though I find them interesting enough) are of little practical value to us "on the periphery." We would welcome a clear lead from them on the points I have mentioned, covering a problem which (if your figures can be applied more generally) affects 50,000 Britons every year.

Sunderland. T. G. LOWDEN.

DANGEROUS CONTAMINANTS IN STORED BLOOD

SIR,—Apparently Dr. Discombe, who wrote last week, infers from my letter that the contamination-rate in consequence of opening bottles of blood for cross-matching in hospital laboratories is 5·1%; but, for the reasons stated in my letter, this is not so. Neither hospital pathologists nor transfusion-laboratory directors can help it if bottles of blood opened in their laboratories for cross-matching are again opened, but not used, in wards or operating-theatres. Such opening is bound to increase the contamination-rate.

As to pilot tubes, I have no desire to embark on a discussion on so controversial a matter except to say that pathologists and technicians having the necessary training can, and do, sample bottles of blood with very low contamination-rate. Also, it has to be borne in mind that occasional bottles will be contaminated at phlebotomy. In either event the contaminating organisms will probably always be non-pathogenic. Provided the blood is used within the prescribed period of opening the bottle, and refrigeration of the blood is constant, no harm is likely to ensue in transfusion, as experience has abundantly shown. Trouble from infection of blood is, of course, only too likely to arise from mishandling of blood after it has left the laboratory. Without doubt the taking of samples of blood from bottles, and the cross-matching of blood, should never be permitted by any persons—doctors or technicians—lacking the appropriate training and experience. For obvious reasons the same rigid standards of aseptic technique in taking blood samples ought to apply to pilot tubes as to blood bottles.

Regional Transfusion Centre, Rhyd Lafar, near Cardiff. R. DRUMMOND.

SIR,—Dr. Discombe states that bacterial contamination kills about 1 in 350,000. Dr. Drummond (Dec. 15) finds that 5·1% of entered bottles are contaminated. Dr. Discombe hesitates to enter the main bottle and relies on the pilot bottle for all his tests. I consider that pilot bottles are reliable; but not all pathologists agree—they quote cases where the pilot bottle contained blood antigenically different to the contents of the main bottle. One has to see their point of view. There will be general agreement that it is undesirable to enter the main bottle unless some strong indication exists—e.g., to give "packed" cells. Even so, contamination can be reduced to a minimum by using a long sterile steel needle for suction, and a second needle, guarded by an air-filter, for the ingress of air. Dr. Discombe may get his figure of 1 in 350,000 from published statistics. The objection here is that not all deaths from this cause are published; it is possible that some are not even suspected. The procedure for establishing that death was due to contaminated blood can be quite difficult. Even if the bottle of blood is removed during the course of the transfusion—without exposure to the air—and taken immediately to the laboratory, where tests are performed without delay, the blood still may have been contaminated at the time of use, and not at the time of taking from the donor or during storage.

As blood escapes from the main bottle and enters the veins of the recipient, every volume of blood is replaced—while the blood is flowing—by an equal volume of air. Strictly, this replacement air should be filtered. Only too often it is not: because the drip has stopped or slowed and someone finds that the rate of flow can be restored by removing the filter. Possibly, also, the filter has become wet with blood, and constitutes a real obstacle. It is sometimes possible to detect contamination of the blood in the main bottle by careful inspection (without removing the bung). The well-known line of hæmolysis at the junction of plasma and cells, the gas bubbles caught in the top layer of plasma, or the gas sometimes seen bubbling up through the cells into the plasma are all indications. Once a bottle has been shaken it is difficult to detect contamination by inspection, in the absence of a bottle centrifuge, for which I should like to make a plea.

Another useful sign is a loose bung. This is a rare occurrence with modern equipment; but only a few years ago a loose bung was not very rare. A loose bung allows contaminated air to be sucked into the main bottle while the contained blood from the donor is cooling from body-temperature down to 4°C. A perfect bottle of blood from a donor after cooling should contain a slight negative pressure. When the bottle is opened for actual use the absence of this negative pressure, or a slight positive pressure should make the user suspicious. Such an occasion would justify the test recommended by Dr. Aidin (Nov. 17 and Dec. 22) on the particular bottle under suspicion. Desperately ill patients have more than one bottle of blood prepared; the transfusion can continue with another tested bottle while the one that behaved suspiciously while being opened is subjected to the procedure recommended by Dr. Aidin.

St. Margaret's Hospital, Epping, Essex. FRANK MARSH.

ERADICATION OF TUBERCULOSIS

SIR,—Dr. Beresford (Dec. 22) draws attention to the incompleteness of notification of tuberculosis. This defect is concisely illustrated by the 1500 cases each year whose tuberculosis is not known to public-health authorities until revealed by death certification.

The reasons for the failure to notify tuberculosis include:

(*a*) Apathy on the part of doctors in hospitals.

(*b*) Assumption that cases have been previously notified when in fact this is not so.

(*c*) The view that the disease cannot ethically be disclosed to anyone except the person suffering from it.

(*a*) It is understandable that those whose skill is concerned with the craft of treatment should overlook their menial duty of notification; but nevertheless, where courtesy fails, it is the statutory duty of the medical officer of health to initiate proceedings against defaulting medical practitioners. This duty is evaded.

(*b*) The regulations require *every* medical practitioner who forms the opinion that a person is suffering from tuberculosis to notify the disease. If he has grounds for believing that the case has already been notified, the medical practitioner diagnosing the diseases is *not* asked to refrain from notifying it.

(*c*) We all tend to accept as an ethical necessity the practice of the mass-radiography units of keeping confidential the names of those cases considered tuberculous; but the fact is that, when the director of a mass-radiography unit forms the opinion from X-ray examination that a person is suffering from tuberculosis,

his statutory duty is to notify the case to the medical officer of health.

The value of notification lies not so much in its statistical use as in the help it gives in revealing tuberculosis among the contacts of the person notified.

Dartford, Kent. J. H. HUDSON.

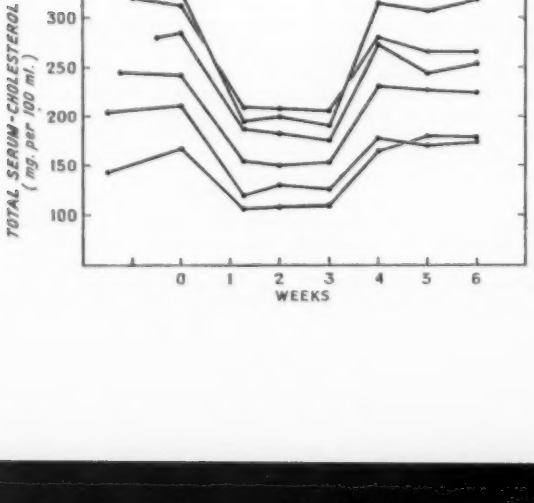
FATS AND DISEASE

SIR,—The reopening of the correspondence (Dec. 8, p. 1211) on your leader of April 28[1] demonstrates how widely this argument occupies medical thinking.

Whilst Dr. Gopalan confirms that sesame oil, which contains about 40% linoleic acid, lowers the serum-cholesterol level, Dr. Gofman and his colleagues state that "the vegetable fat was not seen to have any specific lowering effect." It is important to realise that certain unsaturated fats seem to have not an absolute but only a relative lowering effect on the serum-lipid level. The workers at the Donner Laboratory say that there were no significant differences in S_f 0–20 lipoprotein content during the two experimental periods when their subjects derived 8% of their calories from mixed fat or 43% of their calories from non-hydrogenated cottonseed oil. But when the proportion of fat calories consisting of animal fats rose to 45% of the total daily caloric intake, the S_f 0–20 lipoprotein class was raised by 39% as compared with the period when approximately the same amount of fat was given (i.e., 43%) but in the form of non-hydrogenated cottonseed oil. Thus there was a very definite difference in the S_f 0–20 lipoprotein class when approximately isocaloric amounts of vegetable and animal fats were compared (the carbohydrate intake being practically the same).

I have previously referred to some preliminary experiments[2] using pure corn oil and wheat-germ oil for lowering the serum-cholesterol level. Meanwhile I had the opportunity of administering corn-oil products in a more palatable form.[3]

The chart shows clearly that during the period of changing over to corn oil an immediate and substantial lowering of the serum-cholesterol proportional to the initial cholesterol level occurred. When corn oil was replaced by fats of animal origin a rebound took place within a week's time. The diet of these six patients was calorically not controlled. The intake of visible animal fat was, however, limited to about one teaspoonful of butter daily on their toast at breakfast. Unavoidably they obtained some further fats of animal origin in their food, which contained, besides unlimited amount of carbohydrates, at least 4 oz. of lean meat, or 6 oz. of lean fish, daily. Hence their protein intake was adequate. Wholemeal bread, plenty of fresh green vegetables, and fresh fruit were taken. Tinned food was eliminated. During the period of experiment the patients had, incorporated into skim-milk and cheese, at least 60 g. corn oil daily (which contains 55–60% of linoleic acid), and an adequate supply of vitamins.



1. *Lancet*, 1956, i, 557.
2. Leitner, Z. A. *Ibid*, p. 689.
3. Malmros, H., Wigand, G. *Minn. Med.* 1955, **38**, 864.

My experiments were of short duration, but I have since seen patients in Lund kept on a similar diet for many months, with a continuous lowering of the serum-cholesterol level.[4 5]

Though recognition of the cholesterol-lowering effect of certain vegetable and fish oils is of great scientific importance, the application of any conclusion derived from it to a complex condition such as coronary atherosclerosis calls for great caution. A generation ago Aschoff was already teaching that deposition of lipids in the intima of arteries cannot be expected under any mechanical condition unless hypercholesterolæmia is present. Only under the impact of concerted post-war research (discussed repeatedly in your columns during the past year[1 2 6–8]) it has been assumed "that any dietary factor that raises or lowers the level of β-lipoproteins in the blood will also, by implication, raise or lower the liability to myocardial infarction."[1]

The most difficult aspect is that in a patient with moderate atherosclerosis a comparatively small plaque somewhere in the coronary tree may give rise to gross myocardial infarction, whilst patients with severe generalised atherosclerosis may escape a coronary catastrophe for a long time. Coronary, but not generalised, atherosclerosis has been prevented, or even made regressive, in animal experiments,[9] but this difference in the production of the atherosclerotic lesions has not so far been observed in man. According to hospital statistics atheroma formation appears, if anything, to be no more extensive now than it was thirty to fifty years ago,[10] but the rapid increase of myocardial infarction in recent decades is real[11 12] and, as a common disease, it is new, not merely newly recognised.[10]

For nearly a hundred years, under the impact of Virchow's cellular pathology and Pasteur's discoveries, medical thinking was concentrated on finding one single causative factor of disease. The concept of a multiple ætiology, rediscovered and applied to coronary heart-disease, might explain some of the hazards linked with recent investigations. Coronary heart-disease encountered at the bedside is the end-product of several processes, developed through many years partly unnoticed, in which quite different stimuli, singly or together, lead to the same pathogenic response—hypercholesterolæmia. In the past I have discussed some of these apparently not interconnected stimuli,[13] and have mentioned that on a fat-poor diet emotional stress may elevate the blood-cholesterol level.[14] May I add a few more points which were taken into consideration in the experiments represented in the chart?

In highly industrialised countries, where the greater part of the population is engaged in full-time work in factories and offices, the tendency since the end of the first world war has been towards manipulating and

4. Malmros H., Munke, A., Wigand, G. Conference on Atherosclerosis, Basle, 1956 (in the press).
5. Malmros, H., Munke, A., Wigand, G. Second European Congress of Cardiology, Stockholm, 1956 (in the press).
6. Sinclair, H. M. *Lancet*, 1956, i, 381.
7. Bronte-Stewart, B., Antonis, A., Eales, L., Brock, J. F. *Ibid*, p. 521.
8. Schroeder, H. A. *Ibid*, p. 1017.
9. Pick, R., Stamler, J., Rodbard, S., Katz, N. L. *Circulation*, 1951, **4**, 468.
10. Morris, J. N. *Lancet*, 1951, i, 1.
11. Ryle, J. A., Russell, W. T. *Brit. Heart J.* 1949, **11**, 370.
12. Martin, W. J. *Brit. med. J.* 1956, i, 1523.
13. Leitner, Z. A. *Proc. R. Soc. Med.* 1955, **48**, 672.
14. Groen, J., Tjiong, B. K., Kamminga, C. E., Willebrands, A. F. *Voeding*, 1952, **13**, 556.

processing food. The food industry has become more and more efficient in the presentation of foodstuffs, and also in improving their quality. This "improving," however, has many hidden pitfalls. To mention one example: we are rightly assured that the modern canning process is so effective that canned fruit or vegetables often have a higher ascorbic-acid content than fresh fruit or vegetables stored for a long time. But it has only recently become known that the pyridoxine content of canned or processed food may be reduced. Nutritionists were seriously alarmed when Elvehjem found that American army combat rations used in Korea, consisting of a large variety of processed foods, were deficient in vitamin B_6 as judged by their effect on rhesus monkeys.[15] Other much-praised army rations containing highly processed ham, pork meat, and eggs were inadequate for rats, but they could be made good by substitution with freshly processed similar food.[16] Dr. Sinclair has emphasised in your columns [9] the importance of the pyridoxal enzyme system in the intermediary metabolism with regard to the conversion of linoleic into arachidonic acid, and also the importance of flour of high extraction-rate. In order to prevent even marginal vitamin-B_6 deficiency, my patients received wholemeal bread, only fresh fruit and vegetables, and a generous supply of pyridoxine with their vitamins.

Another aspect of possible vitamin deficiency has to be considered if unsaturated fatty acids are given to patients for a longer time or permanently. Already the discoverer of essential fatty acids found that during his experiments the vitamin-A stores in the experimental animals became depleted.[17] Antagonistic effects of linoleic acid on carotenoids have been previously attributed to oxidation.[18] As the normal adult liver carries a vitamin-A reserve sufficient for a year or longer,[19] and our patients obtained at least 10,000 I.U. of vitamin A with their daily vitamin supply, no signs of deficiency could be detected during the short time of this experiment.

The easy oxidability of unsaturated fatty acids is not necessarily heralded by a rancid pungent odour, especially during the earlier stages when only the labile peroxides are involved. There is now overwhelming evidence that the dietary intake of polyethenoid fatty acids seriously interferes with the metabolism of at least 15 species of farm and laboratory animals. The exact mechanism of this metabolic disturbance is as yet unknown, but the action of the poly-unsaturated fatty acids—mainly present in marine oils—seems to affect the capacity of the tissues to utilise the potential free energy of the ingested food.[20] The resulting pathological lesion affects the whole muscular system, leading to a muscular dystrophy involving occasionally the myocardium with changes in the E.C.G.; the extent of the lesions seems to vary in the different species of animals.[21] Most of these "metabolic injuries" can apparently be prevented or corrected by the administration of α-tocopherol.[22] Vitamin E, being the most powerful physiological antioxidant, will possibly prevent any "oxidative rancidity" in the intercellular metabolism even at the expense of its own destruction. The possibility of precipitating vitamin-E deficiency by administering unsaturated fatty acids was considered during our experiments. The corn oil used contained at the time of preparation about 108 mg. vitamin E per 100 ml., and this might have adequately protected my patients. In future experiments of longer duration it would, however, be absolutely necessary to follow up the serum-tocopherol levels.

15. Tappan, D. V., Elvehjem, C. A. *J. Nutrit.* 1953, **51**, 469.
16. Tappan, D. V., Lewis, U. J., Methfessel, A. H., Elvehjem, C. A. *Ibid*, p. 479.
17. Burr, G. O. *Fed. Proc.* 1942, **1**, 224.
18. Sherman, W. C. *J. Nutrit.* 1941, **22**, 153.
19. Moore, T. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 264, 1949, p. 63.
20. Blaxter, K. L. Vitamina E, Atti del terzo Congresso Internazionale. Venezia, 1955; p. 622.
21. Blaxter, K. L., McGill, R. F. *Vet. Rec. Annot.* 1955, **1**, 91.
22. Blaxter, K. L., Macdonald, A. M. *Lancet*, 1956, **ii**, 895.

In conclusion, there is every reason to believe that man is unable as yet to adapt himself quickly to the plentiful and sophisticated food offered to him wherever Western civilisation penetrates in force. This type of nourishment, together with the Western way of life, uniformly raises the serum-cholesterol level independently of race. These factors seem to be instrumental in producing early and extensive arterial changes, and possibly altering the whole clotting mechanism. Replacement of animal fats by certain oils containing essential fatty acids reduces the serum-lipid levels. If this reduction could be maintained permanently, a novel approach for the treatment (and more so for the prevention) of coronary atherosclerosis would have been gained. There is urgent need for more extensive and coördinated research, as inevitably there are some drawbacks connected with the rapid changing of long-established food habits. No doubt new lanes seem to have been opened to nutritional research, in which modern food industry is bound to take its part. I completely agree with Schroeder,[6] however, that, though it may still take a long time to prove the reversal of arterial lesions by lowering the blood-cholesterol level in man, we now have tools with which more extensive investigations can be undertaken without great risks or inconvenience to patients.

London, W.1. Z. A. LEITNER.

TOWARDS TELEVISION GASTROSCOPY

SIR,—In their most interesting letter of Dec. 22, Prof. Henry Wallman and Dr. Bengt Rosengren report their trials with a midget television-camera assembly inserted into the stomach. In Rheims Dr. Dubois de Montreynaud is routinely demonstrating endoscopic views on closed-circuit television in black-and-white to visitors to his clinic. He uses the Fourestier-Vulmière-Gladu type of endoscope to project the field of view into a light-weight television camera developed for this purpose by Monsieur Minot. While we must wait with interest to see which of these two teams first produces practicably useful colour-television images, I feel the French system preferable in principle, because it is sensible to keep high-voltage television equipment outside the patient's body.

London, W.1. BRIAN STANFORD.

THE USE OF PLASMA

SIR,—In recent correspondence the relative merits and the cost of plasma and dextran have been discussed.[1] Some observations concerning costs and also the capacity of these products to correct hæmostatic defects require further comment.

To attach a theoretical price to a bottle of plasma is misleading, and it is more useful to think in terms of actual expenditure in the conditions prevailing.

Plasma can be prepared from outdated bank blood which has not been used for transfusion. As the outdated blood is already available, and would otherwise be discarded, it has no intrinsic financial value, and the cost of plasma prepared from it is that of the processing. If, however, more plasma is required than can be obtained by processing outdated bank blood, then blood must be collected specially for the purpose, and this must be taken into account in assessing the cost of the extra plasma. Whole blood has been priced variously at figures up to £2 per bottle; assuming a cost of 30*s.* per bottle, the minimum cost of producing a 400 ml. unit of plasma (requiring 2 bottles of whole blood plus processing) is of the order of £3 10*s.*

Dried plasma prepared from outdated bank blood immediately after the expiry date is a useful source of the stable clotting factors. However, for the treatment of deficiencies of labile clotting factors (i.e., antihæmophilic factor and labile factor [factor v]) fresh plasma prepared from specially collected

1. Rainsford, S. G. *Lancet*, 1956, **ii**, 889, 995, 1264. Wallace, J., *Ibid*, p. 945. Clarke, R., *Ibid*, p. 995.

blood is essential, and in view of the increasing quantities being used it is worth emphasising that this product costs at least £3 10s. per 400 ml. unit. (Thus to maintain a hæmophiliac on three bottles a day costs £10 10s. per day for the plasma alone.)

To sum up, the following products are available :

1. Whole blood	£2	per bottle
2. Plasma from outdated blood	under 10s.	,, ,,
3. Additional plasma from blood specially collected for the purpose	£3 10s.	,, ,,
4. Fresh plasma to provide labile clotting factors	£3 10s.	,, ,,
5. Dextran	£1	,, ,,

It appears that outdated blood available from the transfusion centres could provide sufficient stored plasma for all peace-time civilian needs, and therefore for civilian use the cost of plasma for routine use should be taken at the lower figure of under 10s.

Under normal conditions up to 20% of blood collected is not used as whole blood and is available for conversion to plasma. On this basis, the 1955 figures for blood collected in England and Wales indicate that about 80,000 bottles of plasma could be prepared from the outdated blood, and in fact this is approximately the amount manufactured. The figure for dried plasma used in the same year is under 40,000, so a considerable surplus of the less expensive plasma is available.

Regarding the clotting factors, Admiral Rainsford, in his second letter, states :

"Plasma recovered from stored blood or stored for any length of time in the liquid state has little or no hæmostatic properties and is known to produce hæmostatic defects —perhaps because of the large amount of citrate it contains."

It is true that plasma stored for three to six months at room-temperature, or treated with kaolin, is unsatisfactory as a source of clotting factors, but it is not widely thought to produce specific hæmostatic defects, nor does the presence of citrate cause an adverse reaction, except possibly in a very rapid massive transfusion.

Further, dried plasma prepared directly from time-expired blood is a useful therapeutic source of fibrinogen, and other stable clotting factors, although fresher plasma might be used in preference in a patient with a known deficiency. Stefanini and Dameshek [2] state that plasma up to 20–30 days after collection can be used for the treatment of hypoprothrombinæmia, stable-factor (factor VII) deficiency, plasma-thromboplastin-component (Christmas factor) deficiency, plasma-thromboplastin-antecedent deficiency, afibrinogenæmia, and fibrinogenopenia. If such plasma is available, it should be used in the treatment of shocked patients, if there is a likelihood of a clotting-factor deficiency, rather than dextran, which itself tends to cause a coagulation defect. In giving emergency treatment to patients with hæmorrhagic shock it should be remembered that such a clotting defect may already be present, and a watch should be kept on clotting function. In particular, fibrinogen deficiencies may arise in (*a*) various hæmorrhagic complications of pregnancy, (*b*) any condition involving very extensive tissue damage, whether through burning, injury, or surgical procedures.

Caution has been advised in the use of large volumes of dextran,[3] and it has been suggested that for the time being it is best to limit the amount of dextran given to any one patient to one litre. Stable liquid plasma freed from active hepatitis virus by storage at room-temperature would provide a satisfactory alternative for patients with no sign of a clotting defect ; but, as Admiral Rainsford has pointed out, the problem of bacterial contamination has yet to be dealt with. In the case of clear, filtered, kaolin-treated plasma, the contamination difficulty is less serious as the clarity of the final product is an indication of sterility. However, before this product can be widely useful, it is necessary to evolve a technique for kaolin treatment which will give a more stable product than that obtained by the original Maizels method,[4] which remains clear for only a few months.

To sum up, dextran and other plasma substitutes, being free from the danger of serum hepatitis, are useful for the emergency treatment of oligæmic shock. However, in patients who require a large transfusion, or who are likely to have a clotting-factor deficiency, blood or plasma are usually to be preferred, as their clinical value outweighs the danger from hepatitis.

Regional Blood Transfusion Centre, Royal Infirmary, Edinburgh, 3. DRUMMOND ELLIS.

FIBRINOLYSIS AND ATHEROSCLEROSIS

SIR,—Will you permit some rather belated comments on Dr. Astrup's review [5] of the biological significance of fibrinolysis ? There has been considerable discussion in the medical press over the revival by Duguid [6 7] of Rokitansky's hypothesis, advanced more than a hundred years ago, that atherosclerosis follows mural fibrin thrombosis. Duguid's conclusions are based on his observations of thrombotic fibrin layers which become altered and incorporated in the vessel wall to form atheromatous plaques. His contention that this process of mural thrombosis is a recurring phenomenon, with successive fibrin deposits on the endothelium resulting in cumulative thickenings, is aided by my own concept presented in 1953, which serves as a theoretical basis for vascular alterations involving the endothelium.[8]

I consider the inner or "endo-endothelial" lining of the vessel wall to be a fine porous film of fibrin, produced and deposited on the layer of endothelial cells continually during life. Disturbances in the physiological process which produce and maintain this fibrin coating throughout the vascular system are thought to lead to thrombosis or hæmorrhage. Thus on the one hand increased production and deposition of fibrin, or decreased fibrinolysis, would result in thrombosis, while conversely reduced production and deposition of fibrin and increased fibrinolysis would result in hæmorrhage.

Macfarlane and Biggs [9] were the first to describe increased fibrinolysis after strenuous exercise and after adrenaline injection and to emphasise its occurrence in anxiety states, thus suggesting that fibrinolytic activity is a physiological process. According to Macfarlane [10] there is no destruction of fibrinogen in naturally induced fibrinolysis. As there seems to be normally a steady fibrinolytic process, probably affecting primarily the endo-endothelial lining, there must be a concomitant and continuous repair of this fibrin film, thus securing the integrity of the endothelial wall.

There seems to be a highly intricate system of mechanisms which facilitate the formation of the fibrin film on the endothelial cells. In the marginal plasmatic zone of Poiseuille, which is free of cellular elements, practically no blood flows, thus permitting sufficient reaction time for the formation and deposition of non-gelated fibrin, as well as for fibrinolysis. The inter-endothelial spaces permit the infusion of tissue juice containing many factors which, upon mixture with the plasma, result in reactions concerned with fibrin formation and fibrinolysis. Various coagulation-promoting factors, present in tissue juice, activate thrombin from

2. Stefanini, M., Dameshek, W. The Hæmorrhagic Disorders. New York, 1955 ; p. 256.
3. Mollison, P. L. Blood Transfusion in Clinical Medicine. Oxford, 1956 ; p. 80.
4. Maizels, M. *Lancet*, 1944, ii, 205.
5. Astrup, T. *Ibid*, 1956, ii, 565.
6. Duguid, J. B. *Ibid*, 1949, ii, 925 ; *Ibid*, 1954, i, 891 ; *Brit. med. Bull.* 1955, **11**, 36 ; *Practitioner*, 1955, **175**, 241.
7. Duguid, J. B., Robertson, W. B. *Lancet*, 1955, i, 525.
8. Copley, A. L. *Abstr. Comm. 19th int. physiol. Congr.* (Montreal) 1953, p. 280 ; *Arch. int. Pharmacodyn.* 1954, **99**, 426 ; Thrombosis and Embolism, First International Conference, Basle 1955, p. 452 ; *Aerztl. Forsch.* (in the press).
9. Macfarlane, R. G., Biggs, R. *Lancet*, 1946, ii, 862. *Blood*, 1948, **3**, 1167.
10. Macfarlane, R. G. *C.R. 3rd Congr. Soc. int. Europ. Hémat.* Rome, 1951 ; p. 749.

its prothrombin complex and associated factors. The steady infusion of minute quantities of heparin-like materials, released from the mast cells in the subendothelial and perivascular connective tissue, may not be enough to prevent the formation of fibrin particles, but, because of the antigeloplastic effect of heparin, aids in the prevention of vascular occlusion as well as in the maintenance of the fluidity of the blood. We do not know what constitutes an intact endothelium, and it is not known whether the endothelial cells participate in fibrin formation and fibrinolysis—a field of study in which I am at present actively engaged.

In support of the concept of the endo-endothelial fibrin film, recent observations are of interest. Levene [11] examined the electron-microscopic structure of apparently normal aortic intima and found superficial fibres, obtained by scraping, indistinguishable from fibrin. Even though some objections can be raised to Levene's conclusions (e.g., the teased-off specimens do not provide exact knowledge as to their position in the intima, and the periodicity, which Levene gives as a criterion, may not entirely suffice to differentiate between collagen and fibrin), it cannot be stated with certainty that this protein film is not fibrin. Finally, there are our findings on the hæmorrhagic effects of fibrinolysin (plasmin), and on the production of vascular purpura in guinea-pigs by guineapig antifibrin serum of rabbits.[12] It is of interest that Kowalski and his associates [13] found, after streptokinase activation, greater fibrinolysis in the intima as compared to the other layers of human aorta and other human tissues.

Astrup, too, contends that in the healthy organism small amounts of fibrin might be deposited on the walls of arteries. However, his view appears to differ fundamentally from mine, since he limits this deposition to arteries, especially when strain causes tissue damage, and thinks that these deposits are removed by the fibrinolytic system as rapidly as they are formed. In my view the continuous deposition and maintenance of the endo-endothelial film takes place physiologically in all blood-vessels throughout life.

Moreover, the known occurrence of hæmorrhage due to an increase of fibrinolytic enzymes in the bloodstream cannot be explained merely by a fall in antiplasmin and the disappearance of fibrinogen as discussed by Astrup.[14] It seems more likely that hæmorrhages are produced because the introduction of plasmin into the circulation, as I have shown, directly affects the vessel wall, and in particular the endo-endothelial fibrin film. This I consider also to be the explanation for hæmorrhage produced by an in-vivo coagulation defect or by the introduction of an anticoagulant into the bloodstream. Some authors claim that heparin increases fibrinolysis, while Astrup found that it inhibits fibrinolysis. Be that as it may, it is of interest that mast-cell counts made in the vascular wall in atheromatous human aortas were found to be increased. Sundberg [15] relates these findings to the fact that granules of the mast cells contain a heparin-like substance and to its effect on certain lipoproteins. Another aspect which needs to be clarified is whether cholesterol and certain lipoproteins have a special affinity to fibrin surfaces.

It is premature to reach any hard and fast conclusions about fibrin deposition, fibrinolysis, and atherosclerosis, but my concept of the new rôles of fibrin and fibrinolysis gives the findings of Duguid and his associates a physiological basis.

Institut. National d'Hygiène, Paris. ALFRED L. COPLEY.

11. Levene, C. I. *Lancet*, 1955, ii, 1216.
12. Copley, A. L., Gélot, B. *Amer. J. Physiol.* December, 1956 (in the press).
13. Kowalski, E., Kopec, M., Latallo, Z., Roszkowski, S., Sandys, N. *Pol. med. Wkly.* 1956, **11**, 1536.
14. Astrup, T. *Blood*, 1956, **9**, 781
15. Sundberg, M. *Acta path. microbiol. scand.* 1955, suppl. 107.

SHORTAGE OF RADIOGRAPHERS

SIR,—I must deplore Dr. G. H. Illingworth's views on radiographers (Jan. 5).

My experience, previously as a qualified radiographer, and later as a doctor, persuades me there are no grounds for complacency regarding the average standard of radiography in this country. I believe that consistently first-class work is the exception, and where I have met it, it has invariably been done by radiographers who thoroughly understand what they are doing, and the apparatus with which they are doing it.

To lower the standard of entrants to the profession, would, I think, be undesirable; but to lower the standard of teaching would be disastrous. The former would be inevitable if, as Dr. Illingworth seems to suggest, the best posts were reserved for selected male students. If there are enough girls sufficiently foolish to train as radiographers under such circumstances, the standard of work to be expected from them must be abysmal.

Incidentally, how would Dr. Illingworth select his male students?

Milford Chest Hospital, Godalming, Surrey. W. JOAN FERRABY.

SIR,—I entirely disagree with Dr. Illingworth. There is widespread dissatisfaction among radiographers concerning their quite inadequate remuneration, the retiring age, and the terms for "on call." As a radiologist I agree wholeheartedly with their viewpoint.

As regards superintendents, Dr. Illingworth is seeing the problem from the point of view of the large teaching hospital. In the majority of regional board hospitals, the radiologists are part-time and cannot attend to the details of organisation and the endless queries which need experienced handling, and the radiographer in charge, whether superintendent or in smaller hospitals senior in grade, has to carry a heavy responsibility, not only for the standard of work but for the care of the patients also. I should not care to have the work in my department carried out by young girls of a lower educational standard with such inadequate training as is suggested. Not all hospitals are within a short journey of the nearest manufacturer!

St. Stephen's Hospital, London, S.W.10. GRACE BATTEN
Consultant Radiologist and Medical Superintendent.

SIR,—Concern about the inadequate remuneration is certainly not confined to a few male radiographers. At a recent meeting of the North East London Radiographic Group more than 60% present were females and all expressed strong dissatisfaction with the recent award.

All schools are permitted to admit students at the age of 17 and a number already do so. No student, however, is allowed to come into contact with patients until the age of 17½, and the qualifying age remains at 20. This seems an eminently reasonable policy.

The recently published Medical Research Council report on The Hazards to Man of Nuclear and Allied Radiations has indicated that the greatest radiation danger to the general population in peace-time comes from diagnostic radiology. Far from diminishing, diagnostic radiology will be used on an ever-increasing scale if it is to continue playing a crucial part in the investigation of the patients. It is essential therefore that measures to minimise the radiation hazards of diagnostic work be improved. The person who will be primarily responsible in minimising these grave hazards should not only be versed in the art of positioning and correct exposure of films but have an understanding of the basic principles of physics and apparatus construction to make him/her a safe and understanding operator. Surely "an intelligent girl of 17 or 18 with an aptitude for the work" will not be satisfied with being a mere push-button and deprived of any possibility of deriving intelligent stimulation from her work.

What sort of girl is going to take up radiography where there is no prospect of any intellectual satisfaction or any advancement in professional or financial status?

Dr. Illingworth suggests that the way out of our serious difficulties is to use the cheapest and least refractory labour force available and bring the whole profession down to the lowest common denominator. This may be the easiest way but it is the least satisfactory. It reflects an attitude of mind that is unfortunately too common in many walks of life today. If his views prevail not only will a disservice be done to the profession of radiography but patients, medical staff, and not least radiologists themselves, will suffer.

London, N.19. H. M. HARROTT.

DIVERSION FOR THE PATIENT

SIR,—It is reported that background music will be played in order to calm patients undergoing obstetric operations under local anæsthesia. Do doctors ever think of asking patients what they find helpful and comforting during such ordeals? And, quite apart from whether the patient finds music helpful, who is to decide what music shall be played? Some patients would want only the latest hit-song by their favourite crooner; others might have Third Programme tastes.

Surely in these days it is not beyond the bounds of possibility to have specially gifted women whose job would be, first to get to know the patient and her case, then to be at her side throughout her ordeal. One is constantly meeting young mothers who complain that throughout their labour no-one had time to speak a word of comfort or reassurance to them. And this they remember long after they have forgotten their pains. But I have yet to meet one who said: "If only the radio had been on—or television."

Braunton, Devon. WINIFRED CUMMINGS.

MYOPATHY IN SHEEP

SIR,—In your issue of Dec. 29, Dr. Bosanquet, Dr. Daniel, and Mr. Parry again mention the occurrence of vacuolated nerve-cells in the medulla oblongata of sheep affected with scrapie, and they quote in full the opinion expressed by Dr. Holman and myself[1] that "clinical symptoms suggestive of scrapie followed by microscopic discovery of vacuolated nerve-cells in the medulla oblongata probably constitute sufficient evidence on which to base a positive diagnosis of the disease." We would like to state that we have found no evidence since these words were written to cause us to alter or to modify that opinion.

Our conclusion was based on examination of 75 sheep affected with scrapie, 39 sheep dying of diseases other than scrapie, and 59 other sheep that were clinically healthy when slaughtered. Two to six sections of the medulla were examined from each case, and the relationship of the presence of vacuolated cells to clinical scrapie gave a χ-squared value of 155, with P less than 0·0001. We made it clear, however, that the mere findings of vacuolated cells after death was *not* pathognomonic of the disease, because they were occasionally found in animals that had not shown clinical evidence of scrapie. For this reason we emphasised the importance of observing the typical clinical symptoms in establishing a positive diagnosis. We recognised then, as now, that some clinical cases of scrapie may show only a few vacuoles histologically, but in other cases vacuolation is far more extensive than we have ever seen in clinically healthy sheep killed for examination, or in sheep dying from other diseases. An example of such a case was given in our paper, where 1675 serial sections through the medulla gave a count of over 37,000 vacuolated cells.

I have recently examined sections of the medulla oblongata from goats affected with scrapie, and here again, as in sheep, I have no doubt that vacuolation of nerve-cells is characteristically associated with this disease. This work is not yet complete, but counts of vacuolated cells made to date may be of interest:

	Number of sections examined	*Total number of vacuolated nerve-cells found*	*Range of number of vacuolated cells per section*
16 clinically healthy goats	592	8	0 to 1
16 scrapie-affected goats	94	2279	2 to 69

These figures show a relationship between vacuolated nerve-cells and scrapie that is obviously highly significant. Dr. Bosanquet and her colleagues have stated that scrapie is essentially a myopathy. This may be correct, but it does not alter the fact that vacuolated nerve-cells occur in the medulla oblongata of many cases of scrapie in a concentration that far exceeds anything that has yet been recognised in any other disease of goats or sheep.

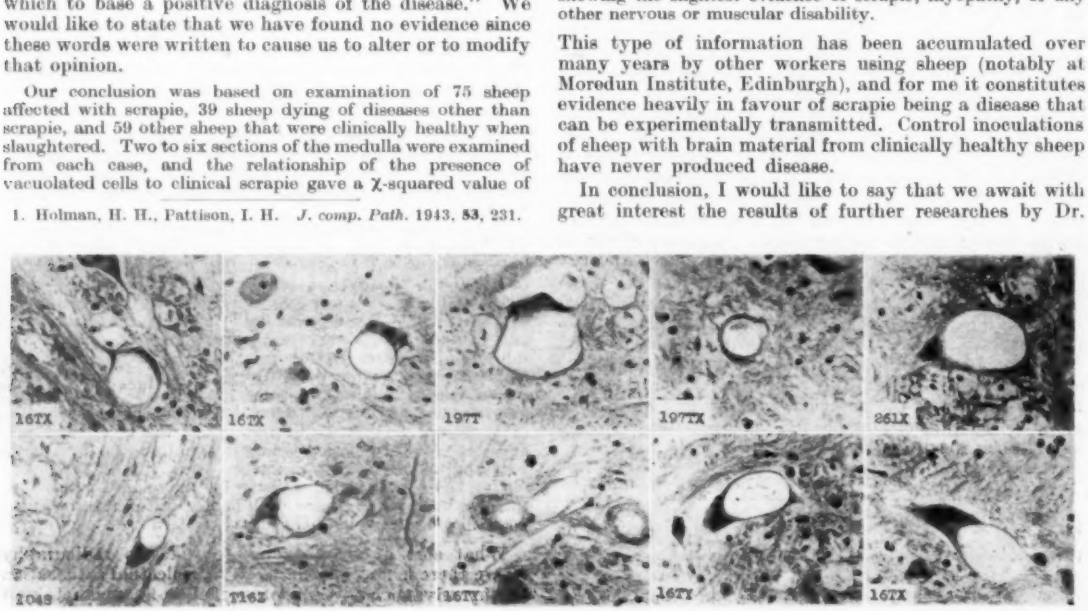
With regard to your contributors' scepticism about the experimental transmission of scrapie, I would like to mention some recent experiences with goats.

In 1954 I inoculated twelve goats from the Compton flock intracerebrally with 1·0 ml. of a 10% brain emulsion from a sheep affected with scrapie. All twelve animals developed the disease, the earliest symptoms being noted 15 months after inoculation. I then inoculated ten more goats with brain emulsion from one of these animals, and to date eight of these have developed the disease. By contrast, over 650 other goats have passed through this flock since 1949 without showing the slightest evidence of scrapie, myopathy, or any other nervous or muscular disability.

This type of information has been accumulated over many years by other workers using sheep (notably at Moredun Institute, Edinburgh), and for me it constitutes evidence heavily in favour of scrapie being a disease that can be experimentally transmitted. Control inoculations of sheep with brain material from clinically healthy sheep have never produced disease.

In conclusion, I would like to say that we await with great interest the results of further researches by Dr.

1. Holman, H. H., Pattison, I. H. *J. comp. Path.* 1943, **53**, 231.



Bosanquet and her colleagues. It may be that myopathy is the essential lesion in scrapie, and it is reassuring, therefore, that with such a wealth of natural, experimental, and control material readily available it will not be long before the relationship of myopathy to scrapie is established to the satisfaction of all concerned in the investigation of this odd disease.

Agricultural Research Council,
Field Station,
Compton, near Newbury, Berks. I. H. PATTISON.

THE Rh BLOOD-GROUPS

SIR,—Your editorial of July 21 criticises the tentative report of the American Medical Association's Committee on Medicolegal Problems because it recommends that "the C-D-E notations for the Rh-Hr types be discarded and that, in approved medicolegal reports, unless and until some other convention is agreed on, the original Rh-Hr nomenclature be retained as the sole nomenclature for this blood group system." This editorial is misleading since it contains serious errors of commission and omission; and, instead of citing scientific observations to support its position, it quotes "testimonials" from papers published almost a decade ago, and closes with four lines of poetry from *Ingoldsby Legends* which have no bearing on the scientific issues at stake.

The issue of the *Journal of the American Medical Association* which contains the tentative report also contains an editorial requesting comments from workers in the field. Since one of the arguments frequently offered by C-D-E advocates is that "99% of workers prefer the C-D-E notations," it is noteworthy that approximately half the letters received in response to this request enthusiastically endorsed the position taken by the committee. If it were true that C-D-E is preferred by the large majority, it would have been easy to obtain agreement by taking up the matter at the recent meetings of the International Society of Hematology in Boston; and it is significant that this opportunity was not used. In fact, one year before the report was prepared by our committee, an effort was made to hold a meeting to discuss Rh-Hr nomenclature; and, to avoid the possible charge of bias, a leading advocate of C-D-E was asked to act as chairman. But the plans for this meeting were abandoned when Race and Fisher both declined an invitation to participate. On the other hand, at a meeting of the International Society of Hematology held in Buffalo six years ago, a committee on Rh-Hr nomenclature was formed of which I was not a member. This committee introduced a resolution that the C-D-E notations be made international, but the motion was withdrawn when I pointed out that this was a problem to be settled not by vote but by work in the laboratory. These facts are not commonly known, and were not mentioned in your inaccurate historical review. Interested readers can find a detailed analysis of the scientific background in recent articles.[1–3]

You said that Race and Sanger "note that only the C-D-E notation indicates which antigens and genes are present, and they are convinced that anti-C and anti-D are more rational names for antibodies than anti-rh′ and anti-Rh_0." This is incorrect since, for example, corresponding to the gene symbol r'^w, Fisher and Race use the "chromosome" symbol C^wdeF, which includes the letters d and F for antigens for which no testing sera exist, and at the same time conveniently omits the letter C (rh′) for a factor present in agglutinogen rh'^w. Yet this assertion and other similar mis-statements in Race and Sanger's book have been quoted over and over in the literature.[4] Moreover, the symbols C and D are not rational, since by assuming a one-to-one correspondence between genes, antigens, and antibodies, no distinction is made between factors, agglutinogens, and genes. This has resulted in numerous paradoxes,[5] and in medicolegal problems could cause mistakes which might result in a miscarriage of justice. For example, the following represents a *hypothetical* case in terms of the Rh-Hr nomenclature:

Blood of	Rh-Hr type	
	Phenotype	Possible genotypes
Putative father	Rh_1rh	R^1r, R^1R^2, or R^2r'
Mother	rh	rr
Child	Rh_2	R^2R^2 or R^2r

Obviously, the Rh-Hr tests do not exclude paternity. Yet in terms of the C-D-E notations the same case might be reported as follows:

Blood of	Most likely genotype
Putative father	CDe/cde
Mother	cde/cde
Child	cDe/cde

Such a report could mislead one into believing that the Rh-Hr tests exclude paternity. That this danger is not merely theoretical can be seen from similar errors in published articles, caused by the use of the C-D-E notations. For example, the diagram of a pedigree in a recent paper [6] shows two women of genotype cDe/cde with children of a genotype CDe/–D–, combinations which would exclude the possibility of maternity!

The main arguments offered nowadays in defence of the C-D-E notations are that they are easier to "understand" and to teach. Significantly, in the 1956 editions of the excellent books by Boyd and Mollison, the tables on the Rh-Hr types list reactions by antisera C, D, E, c, d, and e. While such a simple symmetrical scheme is indeed easy to teach, it is unrealistic since it includes the anti-d (**Hr_0**) which has not been found, but omits anti-C^w (**rh^w**) and anti-f (**hr**). (Incidentally the books of Race and Sanger and of Kabat cite the "discovery" of d as confirmation of the Fisher hypothesis, but in the very next breath confess that the reports in question were almost surely based on faulty observation.) Thus, the simplicity of the C-D-E notations depends on distortion of scientific facts, whereas a good teacher never finds it necessary to distort in order to achieve simplification. Authoritative simplified reviews can be found in many textbooks.[7–12]

Certain correspondents who criticised the report insist that the Rh-Hr nomenclature be dropped and the C-D-E notations be made international, but at the same time, somewhat inconsistently, urge that the so-called "shorthand" symbols be retained. These "shorthand" symbols, widely used by Fisher, Race, and other advocates of C-D-E, are merely minor modifications of the original Rh-Hr nomenclature. Thus, R_1R_2 is used as

1. Wiener, A. S. History of the rhesus blood types. *J. Hist. Med.* 1952, **7**, 369.
2. Wiener, A. S., Wexler, I. B. Interpretation of blood group reactions with special reference to the serology and genetics of the Rh-Hr types. Novant'Anni delle Leggi Mendeliane, edited by L. Gedda. Rome, 1956; p. 147.
3. Wiener, A. S., Wexler, I. B. The Rh-Hr types; a complex problem in serology, genetics, and nomenclature. Editorial, *Ann. intern. Med.* 1956, **45**, 725.
4. Wiener, A. S. The teaching of Rh nomenclature as the responsibility of directors of blood banks. *Bull. Amer. Ass. Blood Banks*, 1956, **9**, 104.
5. Wiener, A. S. The Rh-Hr blood types: a budget of paradoxes. *J. Forensic Med.* 1955, **2**, 224.
6. Buchanan, D. I., McIntyre, J. Consanguinity and two rare matings. *Brit. J. Hæmatol.* 1955, **1**, 304.
7. Colin, E. C. Elements of Genetics. New York, 1956.
8. Gradwohl, R. B. H. Clinical Laboratory Methods and Diagnosis. St. Louis, 1956.
9. Dorland, W. A. N. American Illustrated Medical Dictionary. Philadelphia, 1951.
10. Schatkin, S. B. Disputed Paternity Proceedings. New York, 1954.
11. Gonzales, T. A., Vance, M., Helpern, M., Umberger, C. J. Legal Medicine, Pathology, and Toxicology. New York, 1954.
12. Wiener, A. S. Rh-Hr Syllabus. New York, 1954. Stuttgart, 1955. Naples, 1956. Mexico City, 1956.

"shorthand" for CDe/cDE; but when the subscripts are converted into superscripts, as in the symbol R^1R^2 of the Rh-Hr nomenclature, the symbol apparently becomes unintelligible (cf. pp. 204 and 218 of Mollison's new book).

In conclusion, it must be pointed out that the A.M.A. report was prepared by a fact-finding committee. In discharging its duties, this committee was compelled to exclude all material which it found to be incorrect or to lack experimental basis, so that the charge of bias is inapplicable. Readers who consult the references cited here will find that the problem of Rh-Hr nomenclature is dead scientifically. The only problem remaining is one of education.

Brooklyn, N.Y., U.S.A. A. S. WIENER.

SARCOIDOSIS

SIR,—In your leading article of Dec. 29, you state that Nethercott and Strawbridge have presented important indirect evidence of the presence of tubercle bacilli in lesions of sarcoidosis. Their evidence rests on the claim to have demonstrated α-ε-diaminopimelic acid (D.A.P.) and mycolic acid in hydrolysates of biopsied tissues. Dr. Work (Dec. 22) has dealt with the significance of D.A.P., and our observation of the presence of D.A.P. in a scalene lymph-node, which histologically appeared to be normal, adds point to her remarks. This observation is not unexpected since this type of tissue, in the normal course of events, deals with debris from bacteria, many of which, as Dr. Work stressed, contain D.A.P.

Mycolic acid is much more specific to tubercle bacilli than is D.A.P., and its identification in tissues would be important, but the evidence for its presence is not very convincing.

In the first place, although acid-fastness could indicate mycolic acid, it is surely not justifiable, on the basis of a staining reaction alone, to claim, as Nethercott and Strawbridge[1] do, that mycolic acid was *identified*. Apart from this, the authors have not specified in any detail the conditions of their acid-fast tests, nor have they given any data for normal tissue extracts or for long-chain fatty acids other than mycolic. Though mycolic acid, either free or in certain of its compounds, is thought to be responsible for the acid-fastness of tubercle bacilli, unless the test is carried out under carefully controlled conditions, it is possible to obtain positive results with lipids that do not contain mycolic acid. For instance, we have recently tested, on filter-paper, samples of stearic acid, cholesterol, and an extract of normal subcutaneous-tissue hydrolysate, staining for 5 minutes with carbol fuchsin and washing for 30 minutes with acid alcohol. Stearic acid gave an intense red spot, whilst the others were of moderate intensity.

The authors erroneously describe their solvent-extracted material as "wax." Such substances could not survive prolonged heating with strong acid, and their extract would consist predominantly of a mixture of long-chain fatty acids derived from the fats of the tissue. If mycolic acid were present it would almost certainly form only a very small proportion of the total, and it is therefore rather difficult to see how mycolic acid can be distinguished in the infra-red spectrum of this mixture, or why this spectrum should be so similar to that of wax C; this is very rich in mycolic acid but also contains trehalose, which cannot possibly be present in the tissue extracts. Infra-red spectra give information regarding the functional groups present (OH, NH, C=O, &c.)—for instance, the peaks at 1725 cm^{-1} could correspond to the carbonyl groups of fatty acids. It is not at all obvious, from the spectra presented, that a fatty acid is present which contains 88 carbon atoms—a feature which distinguishes mycolic acid from all other natural fatty acids. In the absence of further data, the similarity of the spectra tells us that similar functional groups are present in both specimens, which is to be expected, since bacterial and animal lipids have many groups in common.

It is to be hoped that the authors can clear up these queries. Perhaps they have more data and intend to publish their results more fully elsewhere. This would be welcome, but, for the present, I think it advisable to accept their evidence for mycolic acid with some reserve.

Canadian Red Cross Memorial Hospital, Taplow, Maidenhead, Berks. R. CONSDEN.

1. Nethercott, S. E., Strawbridge, W. G. C. *Lancet*, 1956, ii, 1132.

SIR,—In your leading article there occurs the sentence: "D.A.P. has been found in *Corynebacterium diphtheriæ* and *Mycobacterium tuberculosis*, but never in normal mammalian tissue." While this statement is true so far as it goes, it gives an incomplete and slightly misleading impression of the distribution of diaminopimelic acid (D.A.P.) in bacteria and the use to which its occurrence in mammalian tissue could be put in diagnosis.

D.A.P. is widely distributed in micro-organisms, as has been shown by Work and collaborators,[1,2] and our own work[3,4] indicates that the bulk of it is most probably in the cell wall of those species in which it occurs. It is certainly present in the cell wall of species of Bacillus, Nocardia and Streptomyces, as well as in Mycobacterium and Corynebacterium, although absent from almost all gram-positive cocci and it has also been found in the cell walls of a few strains of Salmonella, Shigella, Escherichia, and Pseudomonas.[5,6]

Furthermore, since the bacterial cell wall is very insoluble, it may well persist for a considerable time in the tissues of a mammalian host. A chronic infection involving only a few living organisms at any particular time might perhaps pile up a considerable store of material containing D.A.P., which could then be detected chromatographically. On the other hand, persistence of bacterial cell-wall material in the animal body could well mean that D.A.P. found in hydrolysates of tissues had merely accumulated from saprophytic organisms (for example, non-pathogenic diphtheroids) and was not the end-result of any pathological process. In the latter case the finding of D.A.P. in tissue hydrolysates would be very misleading unless its wide distribution among bacteria was borne in mind.

The London Hospital Medical College. C. S. CUMMINS
H. HARRIS.

CONGENITAL HYPERTHYROIDISM

SIR,—We were particularly interested in the account, by Dr. Lewis and Dr. Macgregor, of congenital hyperthyroidism (Jan. 5) because we have recently had a case almost identical in history and appearances, which was described at an Oxford regional pædiatric meeting in December.

In our case we decided not to give anti-thyroid drugs, which might perhaps be harmful, in what was likely to be a transient condition due to maternal thyrotrophic hormone, and we endeavoured to deal with the child's excessive activity and hunger by steadily increasing the amount and strength of feeds, adding casein hydrolysate. For four weeks the weight remained level, then the child began to gain, and the evidences of hyperthyroidism and the thyroid enlargement disappeared. The child now seems to be thriving.

These severe cases are rare, but there is the interesting possibility, suggested by Coccheri,[7] that the very much commoner syndromes of overactivity with feeding difficulty may sometimes be related to a minor degree of hyperthyroidism in the mother.

Reading. J. J. KEMPTON
R. A. RATCLIFF.

CUSHING'S SYNDROME WITH CARCINOMA OF BRONCHUS

SIR,—The article by Dr. Harrison and his colleagues (Jan. 5) is of great interest to me.

A patient in this practice had an operation for ovarian carcinoma in 1938, and died in 1955 at the age of 46 from widespread secondary growths involving the abdomen, thorax, and other sites. In the intervening years she had had radiotherapy many times for secondaries with a remarkably good response.

1. Work, E., Dewey, D. L. *J. gen. Microbiol.* 1953, **9**, 394.
2. Hoare, D. S., Work, E. *Ibid*, 1956, **15**, xiii.
3. Cummins, C. S., Harris, H. *Ibid*, 1956, **14**, 583.
4. Cummins, C. S., Harris, H. *Ibid*, 1956, **15**, ix.
5. Salton, M. R. J. *Biochim. Biophys. Acta*, 1953, **10**, 512.
6. Cummins, C. S., Harris, H. Unpublished results.
7. Coccheri, P. *Lattante*, 1956, **27**, 129.

During the last year of her life she developed a well-marked Cushing's syndrome. The records of her case were (as is usual) forwarded after her death to the executive council, and are unfortunately not now available to me, but I have a vivid recollection of her. Hypertension (systolic over 200) and glycosuria developed, and she became very obese with a typical moon-face. A profuse growth of hair with some pimples appeared on her face. Red striæ were inadvertently not looked for until a late stage in her illness when wasting had started, and they were not then observed.

The association of Cushing's syndrome with carcinoma may be more common than the published records would suggest. Doubtless the late stages of cancer are often observed only by us general practitioners. Confronted with a mystifying condition in these circumstances, we are unlikely to seek further specialist advice, without which we are unlikely to be venturesome enough to publish a record of the case.

Birmingham. W. M. CHESNEY.

Obituary

WILLIAM GEORGE CLARK

C.B.E., M.B. Glasg., F.R.C.P.E.

Dr. Clark, medical officer of health for Edinburgh from 1938 until 1953, died at his home in the city on Jan. 3 at the age of 68.

He was the son of William Clark, a civil and mining engineer, and he was educated in Glasgow. After graduating in medicine in 1910, he held resident appointments at the Glasgow Royal Infirmary, Belvidere Hospital, Glasgow, and Brook Hospital, London. During the 1914–18 war he served as a temporary surgeon in the Royal Navy. After he was demobilised he became an assistant medical officer at Woolwich Tuberculosis Dispensary. In 1920 he took the D.P.H. and joined the staff of the Glasgow health department, in which he rose to become senior deputy M.O.H. During his years in Glasgow he gained a reputation as an administrator and also gave much time and thought to his special interests of health education and the application of epidemiology to the practical issues of infectious disease. Later he made brilliant use of this experience in the sharp outbreak of smallpox in Edinburgh in 1942.

In 1935 Dr. Clark was appointed deputy to the medical officer of health for Edinburgh, and he succeeded him three years later. He was elected an M.R.C.P.E. in 1939, and became a fellow three years later. His distinguished service was recognised by his appointment as honorary physician to King George VI in 1945. When he retired in 1953 he was appointed C.B.E. in recognition of his organisation of the war-time health and casualty services in Edinburgh.

J. M. M. writes:

George Clark was a well-known figure in the public-health service of the United Kingdom for many years. He took a keen interest in the Society of Medical Officers of Health, and was elected its president in 1952. In his own domain he pursued a vigorous policy of prevention, and was never afraid of speaking his mind, either on immediate problems or in the wider councils of public health in the country generally. He was also a lively and successful teacher, exercising a great influence on generations of undergraduate and postgraduate students in the university, where he held the post of senior lecturer until his retirement in 1953.

In 1948 he became one of the original members of the Scottish Central Health Services Council, and he gave it his loyal service despite his outspoken criticisms of the Act and its operation. He had strong leanings towards the preventive side, which he felt was somewhat neglected. He was also an active member of the General Nursing Council, and took a great interest in the educational aspect of its work, with his continuing emphasis on prevention.

His many friends will remember him chiefly as a forceful, robust, and genial man. When something was said with which he disagreed, the big eyebrows would go up and he would look like a forbidding fortress. His first sentence in reply would emerge like a rocket. Then the eyebrows came down and he grinned happily. In support of his views, which were often strongly individualistic, he was a bonny fechter; but he never wounded a friendship. A large-hearted man.

Dr. Clark married in 1921 Gladys Catherine, daughter of C. H. Harrison of Great Yarmouth. She survives him with one son, who is in the government service in Nigeria.

THOMAS ALEXANDER BRITTEN HARRIS

M.D. Melb., F.F.A.R.C.S., D.A.

Dr. Harris, senior anæsthetist and director of the department of anæsthetics at Guy's Hospital, died in London on Dec. 27 at the age of 59.

He was the son of a doctor who was a well-known political figure in Australia, and he graduated M.B. at Melbourne University in 1922. For several years he helped his father in general practice in a small community: this invaluable experience made him a good doctor. He came to this country as an anæsthetist at the West London Hospital. In 1935 he was appointed to the staff of Guy's Hospital, and his enthusiasm and search for knowledge soon made him well known to practically every member of the staff and school: when not teaching anæsthetics, he was picking the brains of the departments of physiology, pharmacology, or biochemistry. He taught anæsthetics in such a way that his students understood the mode of action of the drugs they used and became able to give a simple anæsthetic with confidence and safety. He also joined the staff of St. Peter's Hospital for Stone.

During the late war he served at Tidworth until 1942 when he was posted to India, where he became adviser in anæsthetics to Eastern Command with the rank of lieut.-colonel. One of his duties was to run intensive training-courses, and H. K. A. recalls that he ran them with "energy, conscientiousness, and scrupulous fairness to the candidates."

Whenever Tommy decided (he continues) that a candidate would not make the grade—and it was on his recommendation alone that an officer was or was not posted for anæsthetic duties after attending his course—he nearly always wrote me a personal letter wondering whether or not he was right. But, after a month of intensive tuition from Tommy, there were few who did not make the grade and fewer still who subsequently did not prove in practice the soundness of his teaching. In the monthly intervals between courses he constantly toured the forward areas on the Assam and Arakan fronts, staying with the mobile surgical units and casualty-clearing stations, watching them at work, and after his return to Calcutta, sending clear, concise, and, practical reports on what could and should be done to improve the anæsthetic service and equipment of these units. His energy was boundless. He wrote such an excellent statement of the case for a monetary grant for technical help in his research on the mode of action of anæsthetic drugs that he miraculously extracted it from G.H.Q. India, in spite of that august body's preoccupation with the war. Much of his book was planned and written in his small, comfortable, and always hospitable flat in Calcutta, where he was never happier than when entertaining his friends and colleagues. Despite his serious demeanour and his quiet and deliberate speech in the pleasant Australian accent which he never lost, Tommy was always gay and full of fun.

In 1948 he was elected F.F.A.R.C.S. In 1951 the first edition of his book *The Mode of Action of Anæsthetics* was published, and at the time of his death he was preparing a second edition. He was also studying the barbiturate antagonists, and he was making an extensive survey of the relationship between the use of muscle relaxants and anæsthetic mortality. For much of the time he worked too hard, and even after a coronary thrombosis had compelled him to rest for two months he refused to content himself with a less strenuous life.

W. S. Mc C., who in 1935 had faced the Guy's selection committee with Harris, writes:

The comparatively unknown Australian was appointed in open competition with Guy's men: it was a fortunate day for the hospital, for the hospital secured the lifetime devotion of a loyal and dynamic worker. He so identified himself with the hospital that he resented even mild criticism of Guy's and its traditions by an outsider. As an anæsthetist he was superb. Although not an imposing figure—he was short, and had not completely conquered a slight stutter—he conveyed to me and to his other patients a remarkable degree of confidence and assurance. For the surgeons he provided exemplary operating conditions and an atmosphere of tranquillity. In the years to come Tommy will be remembered as a man who had a

remarkable capacity for making friends. He was proud of his friends and valued their affection, but he had the courage to offer criticism and advice if he thought it would help them. Although forthright in his comments, his loyalty was constant.

Dr. Harris leaves a widow and four sons. A memorial service was held in Guy's Chapel on Jan. 4.

GODFREY TAUNTON HEBERT
D.M. Oxfd, F.R.C.P.

FROM his appointment as physician in charge of the tuberculosis department at St. Thomas's Hospital Dr. Hebert retired with some regret in 1948 as the great promise of streptomycin began to show. Happily he lived to see modern chemotherapy make easier the way of his successors.

He was born in 1888, the son of a Kentish parson, and he was educated at Harrow and Christ Church, Oxford, where he got a first-class honours in physiology. He qualified from St. Thomas's Hospital in 1913, and soon afterwards elected to make his career in tuberculosis. In 1920 he was appointed officer in charge of the Lambeth tuberculosis dispensary in St. Thomas's Hospital and to the tuberculosis department of the hospital. He was responsible for the treatment of tuberculosis in a large district in south-west London, and by present-day standards had little help in dealing with a vast number of outpatients. With one assistant tuberculosis officer he was responsible for a large pneumothorax clinic. He was elected to the full staff of St. Thomas's Hospital in 1927. During the late war his department suffered badly, but through these trying years he continued his full service, at times in very cramped quarters.

Dr. Hebert was, according to the custom of his day, a tuberculosis officer and not a chest physician, but many other conditions passed through his hands for diagnosis. He always warred against woolliness in diagnosis, especially of chest films, and he "took a great delight in pulling his colleagues' legs by giving them tricky X rays." He was a former president of the Tuberculosis Association.

W. M. M. writes:

Dr. Hebert's greatest interest was in the problems associated with pulmonary tuberculosis. He played a leading part in the development and acceptance of artificial pneumothorax therapy in England, and his death severs another link with this important phase in the treatment of the disease. During these earlier years the interpretation of chest X-ray shadows was an ever-present topic for discussion: the significance of cavitation, the presence of fibrosis, and similar questions required answers which were not easily obtained. He loved such controversies and would delight, with a characteristic nod of his head, slight stutter, and a twinkle in his eye, to argue and tease and so illustrate the points of his teaching. His wide experience was invaluable to his assistants and students. Many house-physicians at St. Thomas's served their apprenticeship in practical medicine as clinical assistants in his department. Their knowledge of chest disease and their skill in "needling" owed much to his clear and concise instruction.

In 1919 Dr. Hebert married Miss Constance Tatton, who survives him with two daughters. He died in hospital in London on Jan. 4.

ERNEST THOMAS GASPEY
M.R.C.S.

Dr. Gaspey, formerly medical superintendent of Tehidy Sanatorium, Cornwall, died on Jan. 1 at the age of 68. He should have qualified in Brussels where he was studying medicine when war began in 1914. The invasion of Belgium forced him to come to this country where he qualified in 1916. After the war he took up tuberculosis work and he held posts with the Welsh National Memorial Association and at sanatoriums at Montana and Matlock before he was appointed to Tehidy Sanatorium. C. S. writes: "While Gaspey was in Switzerland he met Spahlinger and observed his treatment of tuberculosis, and Gaspey's account of this was an interesting story. He was superintendent of Tehidy Sanatorium for many years until he retired three years ago. He had a remarkable faculty of remembering and being remembered by his ex-patients and there were few villages in Cornwall where he was not recognised and welcomed by someone for whom he had cared."

JAMES ROY OWEN
M.R.C.P.

Dr. James Owen, senior honorary physician to the skin department of the Royal Northern Hospital, London, died on Dec. 23. He qualified from the Birmingham Medical School in 1929 and held house-appointments at the Queen's Hospital, Birmingham. Later he became first assistant to medical outpatients at the London Hospital and medical registrar at the Royal Cancer Hospital and the National Temperance Hospital. He took the M.R.C.P. in 1937, and after setting up in consultant practice joined the staff of the Hospital for Diseases of the Skin, Blackfriars. During the late war he was in charge of the medical division of an R.A.M.C. general hospital and he also acted as a blood-transfusion officer in the Emergency Medical Service. Besides his appointment at the Royal Northern, he was physician in charge of the skin department at Ashford County Hospital, and honorary physician for diseases of the skin at Hampstead General Hospital, Victoria Hospital for Children, and Queen Elizabeth Hospital for Children.

H. T. H. W. writes:

Those who knew James Owen in former years will remember him as a man of immaculate appearance and debonair charm. He had a passion for adventure and his past activities ranged from jumping by parachute to underwater exploration; with this was coupled a magnificent disregard for the trivialities of life. His essential kindliness endeared him to colleagues, nurses, and patients while his easy wit made him an excellent companion.

HERBERT FOWLIE
M.B. Aberd.

Dr. Fowlie, who died at Aberdeen on Christmas Day at the age of 49, graduated M.B. at Aberdeen University in 1930 and, after house-appointments at Carlisle and experience of general practice in Appleby, settled in practice in that city in 1940.

A colleague writes:

By heredity and environment Hebbie Fowlie should have been a farmer, but he turned to medicine, saying, as he often did, that he "hadna the brains for farming." He soon became one of the busiest, best-known, and best-loved family doctors in Aberdeen. He was of great humanity and transparent honesty, of infinite patience when patience was needful, but of blistering impatience with incompetence or dishonesty. He made friends of all whom he met in his practice, on the golf course, or on his beloved shooting and fishing excursions. He was a wise and considerate colleague and the family doctor of a number of medical households including my own; he paid us a visit only a few hours before his death, and he left us all laughing, for his gaiety was infectious and wherever he went he left laughter and lightened hearts behind him. We, who were his patients, can say with pride and gratitude—"He was our doctor, aye he left us cheered."

Dr. Fowlie leaves a widow, a daughter, and two sons.

Appointments

DOODY, P. J., M.B. N.U.I., D.P.H.: M.O., Wimbledon.
FRANCIS, A. E., M.D. Lond.: assistant pathologist (S.H.M.O.), St. Peter's, St. Paul's, and St. Philip's Hospitals, London.
GRIFFITHS, J. A., M.D. Sheff., F.F.A. R.C.S., D.A.: consultant anæsthetist, United Sheffield Hospitals.
HALDANE, J. D., M.B. Edin., M.R.C.P.E., D.P.M.: deputy physician-superintendent, Fife mental hospitals.
HUDSON, J. G., M.B. Belf., D.A.: assistant anæsthetist (S.H.M.O.), based on the Inverness hospitals.
SCOTT, O. L. S., M.B. Camb., M.R.C.P.: part-time consultant dermatologist, Charing Cross Hospital, London.

Colonial Appointments:

BUCHANAN, G., F.R.C.S.E.: surgeon specialist, Western Nigeria.
EVANS, A. J., M.B. Lond., D.A.: senior specialist, Western Nigeria.
GRAHAM, J. L. T., L.R.C.P.I.: M.O., Northern Nigeria.
HARGREAVES, A., M.B. Cantab.: senior M.O., Kenya.
HAY, I. K., M.B. Aberd., D.P.H., D.T.M. & H.: senior M.O., sleeping-sickness service, Northern Nigeria.
KAPADIA, K. K., M.B. Bombay, D.T.M. & H.: M.O., Western Nigeria.
LETELLIER, F. X., M.R.C.S., D.P.H.: D.D.M.S., Mauritius.
NUGENT, D. A. W., M.B. Madras, D.P.H., D.T.M. & H.: specialist hygienist, ministry of health, Gold Coast.
NWOKOLO, C., M.R.C.P.E.: specialist (physician), Eastern Nigeria.
ONWUMERE, R. E., M.R.C.S., D.O.: specialist (ophthalmology), Eastern Nigeria.
PARKIN C. H., M.D., D.P.H.: senior radiologist, Jamaica.

The Birmingham Regional Hospital Board inform us that Dr. W. G. A. Begg, whose appointment as assistant psychiatrist to Shrewsbury group of hospitals we announced in our issue of Dec. 8, later withdrew from the appointment.

Notes and News

PATHOLOGICAL SPECIMENS BY POST

THE Post Office has expressed concern at the ineffective packing or sealing of some pathological specimens sent through the post. If the material is infected or toxic, this may be hazardous for Post-Office workers, and, through contamination of other mail, for the general public. Sometimes a patient is given a receptacle to send a specimen, but not told how to pack it; written instructions should always be given with containers. The Post Office's instructions for packing such deleterious substances, which may be sent by letter post but not by parcel post, are as follows:

Any such liquid or substance must be enclosed in a receptacle, hermetically sealed or otherwise securely closed, and this receptacle must itself be placed in a strong wooden or metal case (or other case which has been approved by the Post Office) in such a way that it cannot shift about, and with a sufficient quantity of some absorbent material (such as sawdust or cotton-wool) so packed about the receptacle as absolutely to prevent any possible leakage from the package in the event of damage to the receptacle. The packet so made up must be conspicuously marked "Fragile with Care" and bear the words "Pathological Specimen."

MEDICAL MEMBERSHIP OF HOSPITAL AUTHORITIES

THE Minister of Health has accepted the recommendation of the Guillebaud Committee that no more than a quarter of the members of regional hospital boards should be doctors. In a circular to hospital authorities (H.M. [56] 111) he explains that in future he will observe this principle in appointing regional hospital boards, and asks that the boards shall do the same when appointing hospital management committees. The Guillebaud Committee made no recommendation about the membership of boards of governors, and, as university nominees (who may be doctors) sit on these boards as well as representatives of the hospital medical staff, the Minister thinks it inappropriate to limit the proportion of medical members on these boards to a quarter of the total membership. But he has asked R.H.B.s when nominating their members to boards of governors to bear in mind "the desirability of securing a reasonable balance of lay representation."

MEDICAL CARE FOR AMERICAN SERVICEMEN'S DEPENDENTS

THE dependents of American Servicemen who live on or near military posts have by tradition been allowed to share the medical services available to their husbands and fathers. In practice this has come to mean that no medical care is provided for those who probably need it most—the families of men serving overseas. The Dependents Medical Act was passed last year by Congress to correct this anomaly. When the Act was under discussion the Armed Services committees said that the Services could no longer compete with private industry for talented men, because industry offered so much more in benefits such as health insurance. Under the Act the new scheme, which is popularly known as Medicare, came into force last month (*New York Times*, Dec. 25, 1956). It provides hospital and medical care for the 800,000 dependents of Servicemen who do not live at military posts. Hospital fees are being arranged through an insurance company, which is handling the business without profit, and through the Blue Cross, a non-profit organisation. In all save two States doctors' fees will be handled by State medical associations. Where a Service wife prefers to go to a civilian hospital the government will usually pay a substantial part of the costs.

COUNTY CHARITIES

THE Welfare State has not wiped out the need for private charity but it has altered its purpose. The widow can now rely on getting her dole from the post-office, the orphan is sure of his schooling; but both will still be grateful for some extra help—perhaps to buy more coal at Christmas, perhaps to eke out a scholarship which leaves little over for clothes or books. Through the centuries almost every village has acquired some local trusts. With the changing value of money some are today worth much less than their donors intended. Others by fortunate investments have greatly increased their incomes. A register of all this scattered well-doing would be useful to many people, and Dr. J. H. C. Clarke by listing *Charities in Kesteven* has provided what is thought to be the first county list. Other medical officers of health may follow his example, for, as he points out in his introduction, charities "can be regarded as an instrument for the betterment of public health." The present state of honest but ineffective nescience is well shown by the last entry on his list under the heading "Unknown Charity."

An income of 10*s.* 8*d.* p.a. is paid by the Charity Commissioners into the Midland Bank, where it is accumulating, the balance being now a little over £9. Nothing appears to be known locally as to the origin or purpose of the Charity.

By the end of 1957 surely some part of Kesteven will have put that £9 to good use.

NEW MULTILINGUAL JOURNAL

Living Conditions and Health, a new quarterly journal sponsored by the World Congress of Doctors for the Study of Present-day Living Conditions, appears in identical form in English, Chinese, French, German, Russian, and Spanish. The English edition may be had from Dr. A. Ryle, the Caversham Centre, 25, Caversham Road, London, N.W.5 (annual subscription 26*s.*; single copies 7*s.* 6*d.*).

Royal College of Physicians of London

Dr. D. D. Reid will give the Milroy lectures on Tuesday and Thursday, Feb. 5 and 7, at 5 P.M., at the college, Pall Mall East, S.W.1. He will speak on Environmental Factors in Respiratory Disease.

Royal College of Surgeons of England

The Hunterian festival dinner will be held in the college on Thursday, Feb. 14. The guests will include the Archbishop of Canterbury, the Lord Chancellor, the Minister of Education, and the Secretary of State for War. Fellows and members may obtain tickets (£2 10*s.*) from Mr. W. F. Davis, deputy secretary of the college, Lincoln's Inn Fields, London, W.C.2.

International Congress of Therapeutics

This congress, which is sponsored by the International Union of Therapeutics, will be held at Utrecht from June 4 to 6. Further particulars may be had from the general secretary, Vondellaan 6, Utrecht, Holland.

British Association of Plastic Surgeons

At a meeting of this association on Dec. 14, with Mr. Wilfred Hynes in the chair, Mr. R. P. Osborne was elected president-elect and treasurer, and Mr. C. R. McLaughlin hon. secretary.

Royal Appointment

Surgeon Captain Reginald Wear, R.N.V.R., has been appointed an honorary physician to the Queen in succession to Surgeon Captain H. M. Willoughby.

World Federation for Mental Health

Dr. Margaret Mead, president of the federation, will give an address at County Hall, London, S.E.1, on Friday, Feb. 8, at 5.45 P.M., on Mental Health in a Changing World. Tickets (2*s.* 6*d.*) may be had from the National Association for Mental Health, 39, Queen Anne Street, W.1.

Chronic Rheumatic Diseases

A course on this subject, with lectures, ward rounds, and practical demonstrations, is being held at the rheumatism unit of St. Stephen's Hospital, Fulham Road, London, S.W.10, on Saturday and Sunday, March 9 and 10. Further particulars can be had from the secretary, Fellowship of Postgraduate Medicine, 60, Portland Place, W.1.

Education of the Public regarding Cancer

The Central Council for Health Education is holding a conference on this subject at B.M.A. House, London, W.C.1, on Thursday, Jan. 24, at 11.15 A.M. The conference is intended for chairmen of health committees, medical officers of health and their staff, members of hospital staffs, and others interested. The speakers will include Mr. R. W. Raven and Dr. John Burton. Further particulars may be had from the council, Tavistock House North, Tavistock Square, London, W.C.1.

World Medical Association

The World Medical Association, founded in 1947, has as its first object "to promote closer ties among the national medical organisations and among the doctors of the world by personal contact and by all other means available." A British supporting group is to be formed, to stimulate interest in, and provide financial support for, the association. The inaugural meeting will be held at British Medical Association House, Tavistock Square, London, W.C.1, at 3.30 P.M. on Tuesday, Jan. 29.

British Overseas Airways Corporation

Dr. Kenneth Bergin, B.O.A.C.'s medical superintendent, Air Services, has been appointed to the post of chief medical officer to the corporation.

Nuffield Dental Fellowships

One of the aims of these fellowships is to enable graduates in medicine and science to qualify themselves to undertake teaching and research on dental health and disease. Further particulars will be found in our advertisement columns.

Ageing and Old Age

A symposium on this subject, organised by the department of studies in psychological medicine of the University of Liverpool, will be held on Saturday, March 23. The speakers will be Dr. A. Heron, Prof. A. B. Semple, and Prof. Martin Roth. Further particulars can be had from Dr. H. Jarvie, 77, Bedford Street South, Liverpool, 7.

Royal Society of Health

The annual congress of this society is to be held at Folkestone from April 30 to May 3. For the first time it will include a section on hospitals, over which Lord Inman, chairman of Charing Cross Hospital, will preside. The tercentenary of the death of William Harvey coincides with the congress, and Sir Arthur MacNalty, F.R.C.P., will give a lecture on Harvey's influence on public health. Further particulars may be had from the secretary of the society, 90, Buckingham Palace Road, London, S.W.1.

Volunteers for Research on Common Cold

The Common Cold Research Unit at Harvard Hospital, Salisbury, is starting its eleventh year with an appeal for more volunteers, especially for the next two 10-day sessions, starting on Jan. 15 and Jan. 29. From now until the end of March some 100 volunteers are wanted, and there will be vacancies during the rest of the year for 400 to 500. Comfortable living quarters are provided, fares to and from Salisbury are paid up to a maximum of £3, and 3*s.* a day pocket money is allowed. Volunteers should be between 18 and 45 years of age and in normal health. Further particulars may be had from the medical superintendent of the hospital.

Committee on Public Health Engineering

The Institute of Sewage Purification, the Institution of Municipal Engineers, the Institution of Public Health Engineers, the Institution of Water Engineers, the Royal Society of Health, the Royal Institute of Public Health and Hygiene, the Sanitary Inspectors' Association, and the Society of Medical Officers of Health have agreed to set up a coördinating committee to deal with problems in this field. Sir Allen Daley, F.R.C.P., is the chairman and the secretary is Mr. P. Arthur Wells, M.SC. (Royal Society of Health, 90, Buckingham Palace Road, London, S.W.1).

Medical Research Council

The council invite applications for the following fellowships for 1957–58 :

Rockefeller Travelling Fellowships.—These fellowships are intended for graduates resident in this country who have had some training in research work in clinical medicine or surgery, or in some other branch of medical science, and who are likely to profit by a period of work at a centre in the United States or elsewhere abroad, before taking up appointments for higher teaching or research in the United Kingdom.

Dorothy Temple Cross Fellowships in Tuberculosis.—These fellowships offer special opportunities for study or research to British doctors who intend "to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis." The fellowships will, as a rule, be awarded to candidates who wish to make their studies or inquiries elsewhere than in the United Kingdom.

Alexander Pigott Wernher Fellowships in Ophthalmology and Otology.—These fellowships are intended for doctors who are likely to profit by a period of work in ophthalmology or otology at a centre abroad before taking up positions for higher teaching and research in these branches of medical science. The awards will normally be tenable for one year.

All the fellowships provide for the payment of a maintenance allowance at the rate of £650 per annum for a single fellow or £900 per annum for a married fellow ($2700 and $3900 respectively if the fellowship is held in the United States). Allowances are made for travelling and other approved expenses. Forms of application for these fellowships may be had from the secretary of the council, 38, Old Queen Street, London, S.W.1, with whom applications must be lodged by March 15 (March 31 for the Pigott Wernher fellowships).

Diary of the Week

JAN. 13 TO 19

Monday, 14th

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. A. C. Dornhorst: Pulmonary Physical Signs.

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5.30 P.M. Sir Rudolph Peters, F.R.S.: Biochemical Aspects of Vitamin-B Group Disorders in Relation to the Central Nervous System.

Tuesday, 15th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, London, S.W.1
5 P.M. Dr. W. D. W. Brooks: Prevention of Tuberculosis. (Marc Daniels lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Pathology: Epidemiology and Preventive Medicine.* Dr. B. E. Andrews, Dr. J. C. McDonald, Dr. H. G. Pereira, Dr. R. G. Sommerville: Adenovirus Infections.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Prof. L. S. Penrose, F.R.S.: Inheritance of Fœtal Deformities.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Prof. A. J. Lewis: Social Psychiatry.

INSTITUTE OF DERMATOLOGY, Lisle Street, London, W.C.2
5.30 P.M. Miss H. C. Hodges: Conservative Radiotherapy.

Wednesday, 16th

ROYAL SOCIETY OF MEDICINE
8.15 P.M. *General Practice.* Dr. A. Robin Abel, Mr. C. Naunton Morgan: Piles.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
2 P.M. Prof. G. Payling Wright: Cell Regeneration and Pathological Processes. (Second of two lectures.)

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. E. H. Hudson: Results of Prolonged Chemotherapy in Pulmonary Tuberculosis.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Arthur Tickner: Minerals in Skin Metabolism.

EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Dr. Barbara Simonds: Twin Research in Tuberculosis.

ROYAL MICROSCOPICAL SOCIETY, Tavistock House South, W.C.1
5.30 P.M. Mr. J. Smiles: Fluorescence Microscopy. (Presidential address.)

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow
5 P.M. Prof. E. Dahl-Iversen: Diagnosis and Treatment of Hyperplasias and Adenomas of the Adrenals. (Weild lecture.)

Thursday, 17th

ROYAL COLLEGE OF PHYSICIANS OF LONDON
5 P.M. Dr. Raymond Daley: Autonomic Nervous System in its Relation to Some Forms of Heart and Lung Disease. (First of two Goulstonian lectures.)

ROYAL SOCIETY OF MEDICINE
4.45 P.M. *Dermatology.* Dr. R. M. B. MacKenna: Samuel Plumbe—the Forgotten Dermatologist.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
2 P.M. Mr. D. W. C. Northfield: Tumours Involving the Floor of the Third Ventricle.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Prof. E. G. T. Liddell, F.R.S.: Cajal and Sherrington.

INSTITUTE OF CHILD HEALTH
5 P.M. (Hospital for Sick Children, Great Ormond Street, W.C.1.) Prof. C. A. Janeway (Boston): Resistance to Infection in the Child.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
7.30 P.M. Prof. P. C. C. Garnham, Prof. C. P. Beattie, Dr. I. A. B. Cathie, Mr. R. Lainson: Toxoplasmosis.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
8 P.M. Dr. John Read (University of Otago), Prof. Herman B. Chase (Brown University, U.S.A.): Radiation Damage Likely to be Involved in Tumour Regression.

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Prof. C. V. Harrison: Vascular Changes in Pulmonary Hypertension.

ST. ANDREWS UNIVERSITY, Queen's College, Small's Wynd, Dundee
5 P.M. Prof. E. J. King, D.SC.: Enzymes in Clinical Investigation.

Friday, 18th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Pædiatrics.* Professor Janeway: Nephrosis.
8.15 P.M. *Radiology.* Mr. H. Jackson Burrows, Prof. B. W. Windeyer, Dr. J. W. Stewart: Ankylosing Spondylitis.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Prof. Alexander Haddow: Modern Views on Carcinogenesis.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.5
4.45 P.M. Dr. Cuthbert Dukes: Pathology and Treatment of Cancer of the Colon and Rectum. (Dorothy Platt lecture.)

YORKSHIRE SOCIETY OF ANÆSTHETISTS
8.30 P.M. (Leeds General Infirmary.) Dr. W. M. Shearer: Steroid Anæsthesia.

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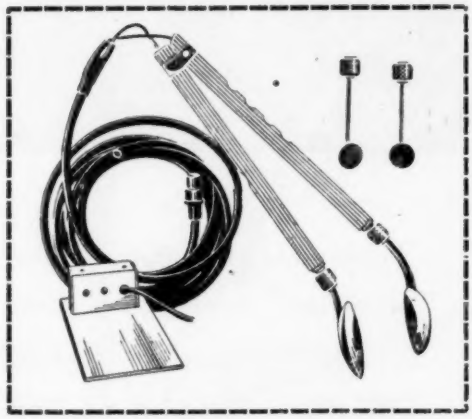

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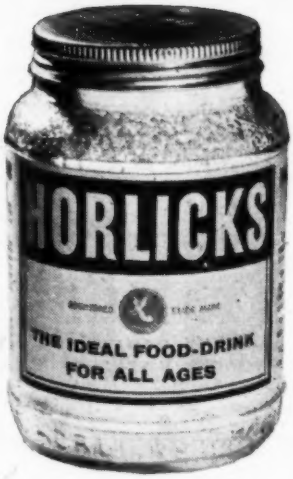

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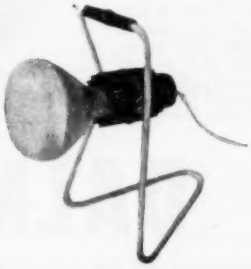

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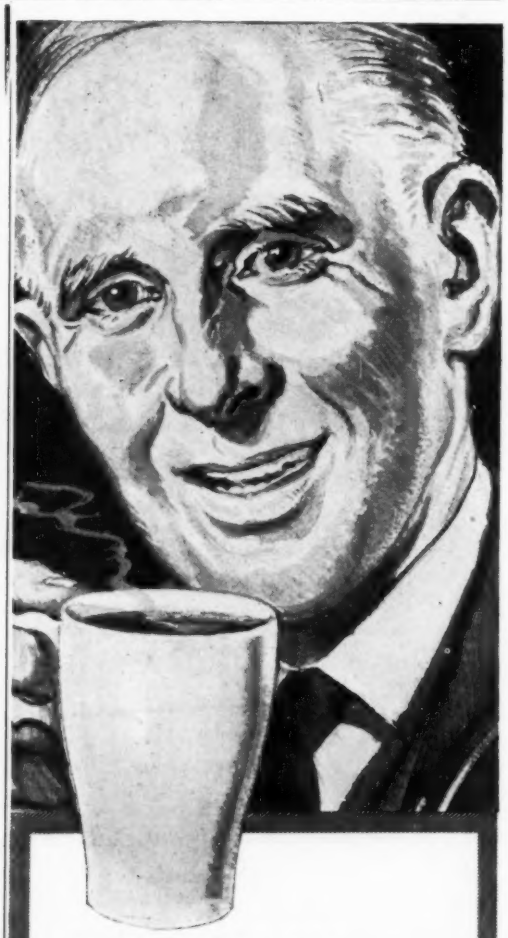

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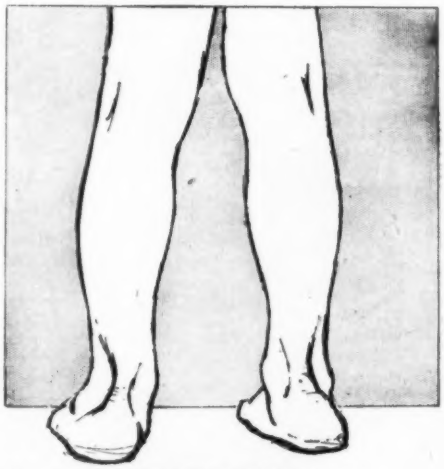

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

UNIVERSITY OF LONDON
INSTITUTE OF ORTHOPÆDICS

COURSE IN DISORDERS OF BONE
28TH JANUARY–2ND FEBRUARY, 1957

Monday, 28th January—Town Section	
General affections of the adult skeleton	Mr. H. J. BURROWS
The kidney and bone disease	Dr. R. NASSIM
General properties of bone	Dr. H. A. SISSONS
Radiology of secondary deposits in bone	Dr. E. H. ALLEN
Tuesday, 29th January—Country Section	
Chemistry of bone	Dr. P. G. WALKER
Metabolic cases	Dr. R. NASSIM
Osteoporosis	Dr. F. H. STEVENSON
General clinical demonstration	Mr. J. I. P. JAMES
Wednesday, 30th January—Town Section	
Osteomyelitis	Mr. H. J. SEDDON
Rare bone infections	Mr. H. J. SEDDON
General clinical demonstration	Mr. D. TREVOR
Thursday, 31st January—Country Section	
Biochemical diagnosis of general bone diseases	Dr. P. G. WALKER
Response of bone and cartilage to infection	Dr. C. H. LACK
General clinical demonstration	Mr. P. H. NEWMAN
Friday, 1st February—Town Section	
Recent advances in the pathology of tumours of bone	Dr. H. A. SISSONS
Bone Tumours (Clinical)	Mr. K. I. NISSEN
Bone repair	Dr. H. A. SISSONS
Bone grafting	Mr. J. N. WILSON
Saturday, 2nd February—Town Section	
Congenital disorders of the skeleton	Mr. A. T. FRIPP
Reticuloses affecting bone	Dr. R. O. MURRAY

The fee for the course (including coffee, lunch and tea) is 7 guineas.

Early application should be made to the Dean, at 234, Great Portland-street, London, W.1.

UNIVERSITY OF LONDON

POSTGRADUATE AWARDS FOR MEDICAL AND SCIENTIFIC RESEARCH

Applications are invited from graduates of the University of London for the following awards for full-time research :—

HAZEL CLIFFORD POSTGRADUATE STUDENTSHIP: value of £550 p.a. for 1 year, renewable for a second year, for postgraduate research in medicine or on a scientific topic concerned with the advancement of medical knowledge.

J. F. H. KNIGHT POSTGRADUATE FELLOWSHIP: value £1000 a year for 2 academic sessions, for research into the social, epidemiological, or preventive aspects of diseases of adult life.

Forms and further particulars from the Secretary to the Scholarships Committee, Senate House, London, W.C.1, to whom applications must be returned not later than 15th February, 1957.

UNIVERSITY OF LONDON

A COURSE OF 2 LECTURES on (i) "The Structure of Cytochrome c" and (ii) "Relations between F.M.N. and Apoprotein in the Old Yellow Enzyme" will be given by Prof. H. THEORELL (Stockholm) at 5 P.M. on 29th and 30TH JANUARY at Westminster Medical School (Meyerstein Lecture Theatre), Horseferry-road, S.E.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF GLASGOW

MAURICE BLOCH MEDICAL RESEARCH FELLOWSHIP

Applications are invited for the Maurice Bloch Medical Research Fellowship, tenable in the field of virology, with particular reference to poliomyelitis. The value of the Fellowship is £1200 p.a., rising by £100 p.a., to £1500 p.a., and the starting point in the scale will be fixed in accordance with qualifications and experience. Applicants should preferably be over 30 years of age.

Applications (12 copies) should be lodged, not later than 28th February, 1957, with the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON, Secretary of University Court.

THE NUFFIELD FOUNDATION

FELLOWSHIPS AND SCHOLARSHIPS IN DENTISTRY

The Nuffield Foundation invites applications, from citizens of the United Kingdom, for Fellowships and Scholarships in Dentistry. To help the advancement of teaching and research in the United Kingdom on dental health and disease, the Foundation is prepared to award a number of Fellowships :

(i) to enable selected Men and Women with dental qualifications to receive such additional training in pure and applied science as is desirable to fit them for an academic career in dentistry (but not to obtain a medical qualification) ; and

(ii) to enable selected university graduates in medicine and science to receive training that will qualify them to undertake teaching and fundamental research on dental health and disease.

The Foundation is also prepared to award a limited number of Scholarships to assist students of outstanding ability attending a university dental school to devote 1 or 2 years to further studies of the basic sciences.

Applications for Fellowships (which are awarded once a year) should be received by 1st March and for Scholarships (which are awarded twice a year) by 31st January or 30th June. Copies of the conditions of both Fellowships and Scholarships and the application forms are obtainable from the Director. The Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1.

L. FARRER-BROWN, Director of the Nuffield Foundation.

THE NUFFIELD FOUNDATION

MEDICAL FELLOWSHIPS

As part of its programme for the advancement of health, the Nuffield Foundation is prepared to award a number of Fellowships to highly qualified Men and Women of the United Kingdom, usually between the ages of 25 and 35, who wish to train further for teaching and research appointments in any branch of medicine.

Applications for awards in 1957 must be received not later than 1st May, 1957. The conditions of these Fellowships and the application forms are obtainable from the Director, The Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1.

L. FARRER-BROWN, Director of the Nuffield Foundation.

EDINBURGH POST-GRADUATE BOARD FOR MEDICINE

GENERAL SURGERY

3 months courses of post-graduate Surgery suitable for surgeons requiring a refresher course in the current outlook on general surgery or for graduates preparing to specialise in surgery, start on 18TH MARCH and 30TH SEPTEMBER, 1957. The programme has been arranged so as to provide coördinated clinical and systematic instruction in general surgical wards and specialised surgical units in Edinburgh. Fee £31 10s.

MEDICAL SCIENCES

A 3 months course in Applied Anatomy, Physiology, Pathology, Bacteriology, and Biochemistry will begin on 24TH JUNE, 1957. This course includes an adequate amount of practical instruction and is suitable for post-graduates wishing to take the Primary Fellowship examination. Fee £31 10s.

2 courses in the Basic Sciences (Anatomy, Physiology, Pathology, including Bacteriology) are arranged by the Royal College of Surgeons, under the ægis of the Edinburgh Post-Graduate Board for Medicine. These courses comprising lectures, demonstrations, and practical instruction, will begin on 11TH FEBRUARY and 14TH OCTOBER, 1957, and continue for 10 weeks. Fee £26 5s.

The courses in Medical Sciences are designed as a final preparation for the Primary Fellowship examination and it is essential that those attending should already have a considerable knowledge of the subjects.

INTERNAL MEDICINE

Courses lasting 12 weeks, suitable for graduates desiring a refresher course, or to specialise in Medicine, begin on 25TH MARCH and 23RD SEPTEMBER, 1957. These courses consist of 320 hours instruction, comprising lectures, clinical demonstrations, and ward visits. Fee £31 10s.

The Royal College of Physicians of Edinburgh award 2 Hill Pattison-Struthers Bursaries each year to graduates attending the Internal Medicine course. Each Bursary amounts to £100. Applications must be submitted to the Secretary, Royal College of Physicians, Edinburgh, before 1st February, 1957.

Additional instruction in Clinical Pædiatrics and in Tropical Medicine is arranged in conjunction with the course in Medicine. There is a small additional fee and the numbers are limited.

Applications for enrolment should be addressed to the Director of Post-Graduate Studies, Surgeons' Hall, Edinburgh, 8, supplying particulars of qualifications and post-graduate experience.

THE MIDDLESEX HOSPITAL MEDICAL SCHOOL

LEVERHULME RESEARCH SCHOLARSHIP IN CLINICAL MEDICINE

Applications are invited for a Leverhulme Research Scholarship, value £1000 p.a., plus superannuation. The Scholarship shall be for 1 year in the first instance. The scholar must satisfy The Middlesex Hospital Medical School that the major part of his time will be spent in research, but he may be allowed to hold other appointments. The work may be related to any branch of medicine, must be essentially clinical and will be carried out in the Institute of Clinical Research attached to the Middlesex Hospital Medical School.

Applications, with the names of 2 referees, and a summary of the proposed work should reach the Secretary of the Institute of Clinical Research, The Middlesex Hospital Medical School, 40, Hanson-street, London, W.1, not later than 31st January, 1957.

UNIVERSITY COLLEGE LONDON

FREE PUBLIC LECTURES, SPRING TERM, 1957

MONDAYS, 21ST, 28TH JANUARY, 4TH, 11TH FEBRUARY, at 5 P.M., Dr. D. J. D. NICHOLAS, "The Rôle of Metals in Enzymes with special reference to Flavoproteins."

THURSDAYS, 31ST JANUARY, 7TH FEBRUARY, at 5.15 P.M., Prof. F. BERGEL (1) "Recent Advances in Cancer Research" ; (2) "Chemical Aspects of Psychopharmacology."

MONDAYS, 18TH, 25TH FEBRUARY, at 5.30 P.M., Dr. T. S. WORK, "A Biochemical Approach to the Problems of Protein Synthesis."

Details of all public lectures (including lunch-hour lectures) from Publications Officer, University College London, Gower-street, W.C.1 (stamped envelope required).

THE NEW ZEALAND BRANCH BRITISH EMPIRE CANCER CAMPAIGN

J. R. MCKENZIE CANCER RESEARCH FELLOWSHIP

Applications are invited from suitably qualified persons for the above Fellowship. The successful applicant will be required to carry out research in cancer at the Medical School, University of Otago, Dunedin, N.Z., under the supervision of Dr. F. Bielschowsky (Director of Cancer Research). Salary £1275–£1900 p.a., according to qualifications and experience.

Further particulars may be obtained from the General Secretary, British Empire Cancer Campaign, 11, Grosvenor-crescent, Hyde Park-corner, London, S.W.1.

Applications should be forwarded air-mail to reach the Secretary, New Zealand Branch B.E.C.C., P.O. Box 609, Wellington, N.Z., not later than 15th March, 1957.

L.M.S.S.A.

FINAL EXAMINATION: SURGERY, 11th February, 11th March, 8th April, 1957. MEDICINE, PATHOLOGY, 18th February, 18th March, 15th April, 1957. MIDWIFERY, 19th February, 19th March, 16th April, 1957. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries Hall, Black Friars-lane, London, E.C.4.

CHARING CROSS HOSPITAL MEDICAL SCHOOL. ASSISTANT LECTURER IN CLINICAL PATHOLOGY. Candidates must have experience in Hæmatology and Bacteriology, and will be expected to assist in the routine investigations, teaching and research. The appointment will be in the first instance for 2 years, with commencing salary £900 p.a. and an increment of £50 for the second year. On completion the holder will be eligible for promotion to Lecturer grade, salary £1000 p.a. –£100–£1300, with superannuation and family allowances.

Applications on the prescribed form must be sent to the Secretary, Charing Cross Hospital Medical School, 62–65, Chandos-place, W.C.2, and must be received not later than the first post on Monday, 21st January, 1957.

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL, London, S.E.1. A Locum SENIOR LECTURER is required in the Department of Obstetrics and Gynæcology for about 6 months, commencing at the end of February. Salary will be in the Senior Registrar range according to experience.

Applications, with the names of 2 referees, should be addressed to the Dean of the Medical School and be received by 9th February, 1957.

THE UNIVERSITY OF LEEDS—UNITED LEEDS HOSPITALS. Applications are invited for appointment as SENIOR REGISTRAR AND TUTOR IN DERMATOLOGY at a salary on the scale £1100–£100–£1400 a year.

Applications (3 copies), stating date of birth, qualifications, details of present and previous appointments with dates, and experience of teaching, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 11th February, 1957.

THE UNIVERSITY OF MANCHESTER. Applications for the post of LECTURER IN MEDICAL STATISTICS are invited from medical or non-medical graduates. Salary within the range £1000–£1800 p.a. (for medically qualified persons), or £650–£1350 p.a. (for non-medically qualified persons). Initial salary according to qualifications and experience. Membership F.S.S.U. and Children's Allowance Scheme.

Applications should be sent not later than 9th February, 1957, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

MAKERERE COLLEGE. The University College of EAST AFRICA. Applications are invited for appointment as FIRST ASSISTANT in the Department of Obstetrics and Gynæcology. Salary scale £2013–£57–£2184–£60–£2244 p.a. Child allowance £50 p.a. per child (maximum £150 p.a.). Passages for member of staff and family (up to 4 adult passages) on appointment, termination, and leave (3 months every 21 months). Rent according to quarters provided, £45–£84 p.a. (including basic furniture). Duties to be assumed as soon as possible after 1st July, 1957. Appointment on secondment (minimum 21 months) would be considered.

Detailed applications (6 copies), naming 3 referees, by 14th February, 1957, to Secretary, Inter-University Council for Higher Education Overseas, 29, Woburn-square, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF WESTERN AUSTRALIA. The Senate of the University of Western Australia is proceeding with the establishment of a Faculty of Medicine and applications are invited for the CHAIR OF CHILD HEALTH. It is planned to have the new Medical School ready for occupation and teaching in 1957 and appointments have been made to all Chairs except that for Child Health. The salary of the Professor will be £A3710 p.a., and an allowance is made towards travelling expenses.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications in Australia and London, is 31st March, 1957.

Hospital Services: Senior Appointments

HOSPITALS FOR DISEASES OF THE CHEST. The Board of Governors invites applications for 2 appointments of CONSULTANT RADIOLOGIST (Diagnostic) tenable in the first instance at London Chest Hospital. Applicants must hold a Diploma in Diagnostic Radiology. The duties to be covered involve 3 half-days each week (Mondays, Wednesdays, and Fridays) at the Hospital, Victoria Park, E.2, and 1 half-day in alternate weeks at the country unit at Arlesey, near Letchworth. This range of duties is to be shared equally between the 2 successful candidates on a fixed rotational schedule, details of which will be given to intending applicants.

Applications (12 copies), stating date of birth, qualifications, and experience in full, with names of 3 referees, to reach the undersigned not later than 16th February, 1957.

KENNETH A. F. MILES, Secretary to the Board.
Brompton Hospital, S.W.3.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CONSULTANT HOMŒOPATHIC PHYSICIAN (2 half-days a week), Royal London Homœopathic Hospital, Great Ormond-street, W.C.1 (183 Beds). Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, before 18th February, 1957.

ROYAL MASONIC HOSPITAL, Ravenscourt Park, London, W.6. Applications are invited for the appointment of CONSULTANT ANÆSTHETIST at the above Hospital as from 1st April, 1957, for a session on Wednesday afternoons.

Applications, giving detailed information and the names and addresses of 3 referees, should reach the undersigned (from whom further information may be obtained) on or before 26th January, 1957.

R. E. LAWSON, Secretary and House Governor.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as CONSULTANT in Diagnostic Radiology for 2 notional half-days a week in the Greenwich and Deptford Group of hospitals, for duties at St. Alfeges Hospital, Vanbrugh Hill, Greenwich, S.E.10. Candidates must have had a wide experience in the specialty and hold an appropriate diploma. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales). Candidates may visit the Hospital concerned.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1 not later than 25th January, 1957.

ST. THOMAS'S HOSPITAL, London, S.E.1. Surgeon to the Orthopædic Department. Consultant status, with membership of the Medical Committee. 5 sessions per week. Vacant September, 1957.

Applications (12 copies), naming 3 referees, to the Clerk of the Governors by 8th February, 1957.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Part-time CONSULTANT ORTHOPÆDIC SURGEON (7 notional half-days weekly). Duties at Bromsgrove General (2½ notional half-days) and Kidderminster General (3½ notional half-days) Hospitals, also Redditch Orthopædic Clinic (1 notional half-day), experience specialty/higher qualification required.

Applications (15 copies), stating name, age, nationality, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 28th January, 1957.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the appointment of CONSULTANT RADIOLOGIST on the basis of whole-time or maximum part-time service. The successful candidate may be required to undertake postgraduate studies in other approved centres either in this country or abroad, for which purpose a Fellowship will be available which will include travelling expenses, a subsistence allowance and a basic salary.

Applications, giving the names of 3 referees, must be submitted on a special form to be obtained from the undersigned. The closing date will be 9th February, 1957.

G. A. PHALP, Secretary and Principal
Administrative Officer, United Birmingham Hospitals.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. Applications are invited for the post of Whole-time or maximum Part-time CONSULTANT PSYCHIATRIST to the United Cambridge Hospitals from July, 1957. The successful applicant will also be offered an honorary contract with the East Anglian Regional Hospital Board. The main duties of the post will be at Addenbrooke's and Fulbourn Hospitals, Cambridge. The terms and conditions of service for hospital medical staff will apply.

Applications, stating age, qualifications, and experience, and the names of 3 referees, should reach the undersigned, from whom further details may be obtained, by 16th February, 1957. The Advisory Appointments Committee will be held in March.

Addenbrooke's Hospital. P. J. BOURNE, Secretary.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ASSISTANT RADIOTHERAPIST (whole-time), Ipswich and East Suffolk Hospital. The department, which is about to have a Telecæsium Unit installed, is the Radiotherapy Centre for the South East quadrant of the Region. Higher qualification and wide experience in specialty necessary. Salary scale £1575–£2025.

Applications (8 copies), stating age, experience, and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 21st January, 1957. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital (Anglesea Road Wing), Ipswich.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for appointment as CONSULTANT NEUROSURGEON. The appointment is for 1 notional half-day and will be of junior status. Candidates must possess a registrable qualification and Fellowship of the Royal College of Surgeons of England, Edinburgh or Ireland.

Apply by 2nd February, 1957, giving full particulars of age, qualifications, experience, &c., and details of present and previous appointments together with the names of 3 persons to whom reference may be made, to the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL REGIONAL HOSPITAL BOARD. Deva HOSPITAL, near CHESTER. Applications are invited for the post of Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) with duties at the above Hospital, including attendance at outpatient clinics outside the Hospital. Applicants should possess the D.P.M. or an equivalent qualification and have reasonable experience in psychiatry, including practical knowledge of outpatient work. Residential accommodation is available.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 2nd February, 1957.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL REGIONAL HOSPITAL BOARD. Sefton MENTAL HOSPITAL. Applications are invited for the post of Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) with duties at the above Hospital (180 Beds), including medical administrative duties. Applicants should possess the D.P.M. or an equivalent qualification and have experience of work in a small mental hospital admitting large numbers of acute cases.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 2nd February, 1957.

VINCENT COLLINGE, Secretary to the Board.

LEEDS REGIONAL HOSPITAL BOARD. Whole-time Locum SENIOR HOSPITAL MEDICAL OFFICER in Chest Diseases for an initial period of 3 months for duties at Killingbeck Hospital, Leeds, with regular outpatient clinics at Morley and Garforth. Accommodation may be made available.

Applications, stating age, qualifications and details of appointments held showing dates, together with the names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, as soon as possible.

LEEDS REGIONAL HOSPITAL BOARD.

Geriatrics

Whole-time or maximum Part-time CONSULTANT GERIATRICIAN, Halifax Group of hospitals (466 Beds). The successful candidate will be in clinical charge of the Geriatric Service in the area and will be required to reside in Halifax.

Radiotherapy

Whole-time ASSISTANT RADIOTHERAPIST (Senior Hospital Medical Officer scale) in the Regional Radiotherapy Service for duties mainly at the Bradford Radium Institute together with relief duties, and may be required at other Radiotherapy Centres in the region. The person appointed to work under the supervision of the Senior Consultant in Radiotherapy and to reside in the Bradford area.

Applications (12 copies), stating age, qualifications and details of appointments held showing dates, with names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 30th January, 1957.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Whole-time NON-RESIDENT ASSISTANT RADIOTHERAPIST (Senior Hospital Medical Officer), Christie Hospital and Holt Radium Institute, Manchester. F.F.R. or other higher qualification desirable; appointee to live in or near Manchester. 28th January, 1957.

(*b*) Whole-time NON-RESIDENT ASSISTANT VENEREOLOGIST (Senior Hospital Medical Officer) for Manchester area, mainly at St. Luke's Clinic and Seamen's Dispensary, Salford. Appointee will work under general guidance of Consultants and be required to undertake holiday, &c., relief work in other parts of Region as may be necessary from time to time and to live in or near Manchester. Wide experience essential. 30th January, 1957.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by the dates stated.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum CONSULTANT RADIOLOGIST for Hexham and Newcastle Groups of hospitals. Approximately half of time to be spent in each group.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, immediately.

NEWCASTLE REGIONAL HOSPITAL BOARD. Special AREA COMMITTEE FOR CUMBERLAND AND NORTH WESTMORLAND. CONSULTANT SURGEON (Senior), whole-time or maximum part-time, to be Head of Clinic No. 1, West Cumberland Group of hospitals, main hospitals: Workington Infirmary (118 Beds), Whitehaven Hospital (124 Beds). The building near Whitehaven of a new hospital of 400 Beds is planned to commence in 1957. Area of residence to be determined by the Special Area Committee.

Applications, together with names and addresses of 3 referees, to be sent to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 28 days.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Applications invited for the post of ASSISTANT PLASTIC SURGEON (Consultant grade) at the Royal Hospital and its Fulwood Annexe under the Board of Governors of the United Sheffield Hospitals, and PLASTIC SURGEON with the Regional Hospital Board. The appointment will be either whole-time or maximum part-time. It is anticipated that the successful candidate will spend at least 6 notional half-days in the Teaching hospitals, and there will be 3 notional half-days in Regional Board hospitals.

Applications (16 copies), stating age, qualifications and experience, with the names and addresses of 3 referees, should be sent not later than 9th February, 1957, to the Chief Administrative Officer, The United Sheffield Hospitals, Central Office, West-street, Sheffield, 1, from whom further details may be obtained.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT CARDIOLOGIST for 4 half-days per week for the Western Area Thoracic Surgical Unit, Southampton Chest Hospital, in the Southampton Group of hospitals. Candidates must hold higher qualifications and be fully conversant with all modern techniques in use for the diagnosis of acquired and congenital heart-disease. Residence in the Southampton area will not be a condition of the appointment. Canvassing will disqualify, but applicants may visit the Hospital by arrangement with the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

Applications (7 copies), stating age, qualifications, experience and the names and addresses of 3 referees, should be sent to the Area Secretary, Highcroft, Romsey-road, Winchester, by 30th January, 1957.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time PHYSICIAN-SUPERINTENDENT AND CONSULTANT PSYCHIATRIST at Warlingham Park Hospital, Surrey. Candidates should possess D.P.M. and a higher medical qualification, and should have wide experience in psychiatry and a knowledge of medical administration. A house is available.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 9th February, 1957. Applicants may visit Hospital by local arrangement.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of DEPUTY MEDICAL SUPERINTENDENT at Sandhill Park Hospital, Bishops Lydeard, near Taunton. This Hospital, with its ancillary units at Yatton, Flax Bourton, Shepton Mallet, Frome and Loxton, contains about 800 Beds for mentally defective patients of all grades and ages. In addition, there is an extensive licensing scheme involving 120 to 130 patients. The appointment will be on a whole-time basis in the Senior Hospital Medical Officer grade. Applicants should possess the D.P.M. and previous experience in mental deficiency work is essential. The successful candidate will work under the general direction of the Medical Superintendent, and will be required to live convenient to Shepton Mallet or Taunton.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 31st January, 1957.

WELSH REGIONAL HOSPITAL BOARD. Additional CONSULTANT ANÆSTHETIST, Merthyr and Aberdare Hospital Management Committee. Based at Merthyr General Hospital. F.F.A.R.C.S. essential. Successful applicant would be required to reside within a reasonable distance from the hospitals served. Optional whole-time/maximum part-time appointment.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

AUSTRALIA. ROCKHAMPTON HOSPITAL, QUEENSLAND. Applications in writing are invited for appointment for 3 years to the following part-time Specialist appointments at the Rockhampton Hospital:—

PHYSICIAN. 1 session of 3 hours per week divided into an outpatient session of 2 hours and an inpatient session of 1 hour. Salary £340 p.a.

EAR, NOSE AND THROAT: 1 outpatient session of 3 hours per week and 1 inpatient session of 3 hours per week. Salary £680 p.a.

Rockhampton has a population of 42,000 and is the centre of a district of 90,000 in population.

Further particulars regarding position and opportunity for private practice will be forwarded upon request. Appointees to be not over 60 years of age.

Applications should be addressed to the Secretary, Rockhampton Hospitals Board, Rockhampton (QLD.). Applications close 28th February, 1957.

SOUTH AFRICA. PROVINCIAL ADMINISTRATION OF THE CAPE OF GOOD HOPE. UNIVERSITY OF CAPE TOWN: Joint Medical Staff for Groote Schuur and other Teaching Hospitals. Vacancy:—

Applications are invited from registered medical practitioners (registered Specialists) for appointment to the following vacant post at the Groote Schuur Hospital, Observatory Cape Town:—

DEPARTMENT OF NEUROLOGY AND PSYCHIATRY

MEDICAL PRACTITIONER (Grade F), Psychiatrist, with salary £1980 p.a. (fixed).

Initially the successful applicant will be offered a contract appointment up to 31st December, 1957.

In addition to the basic salary, a non-pensionable cost-of-living allowance at rates prescribed from time to time by the Administrator (at present amounting to £234 p.a.), is payable to certain whole-time married officials and employees.

The conditions of service are governed by the relevant Ordinances and Regulations as well as the agreement entered into between the Cape Provincial Administration and the University of Cape Town.

The Joint Medical Staff is required to serve jointly the Provincial Administration and the University of Cape Town.

Candidates must be registered Specialists in Psychiatry or must be in possession of an appropriate postgraduate diploma or degree, and are requested to furnish particulars in regard to the following:—

(*a*) Academic achievements (degrees and diplomas held and the standard of achievement in professional examinations; scholarships and special awards).

(*b*) Professional experience (not only a statement of employer, but the institution in which the individual worked and the type of work undertaken).

(*c*) Names of 3 referees (1 of these should preferably be someone occupied in the same branch of medicine as the candidate), or to approach their referees to submit confidential reports to the Director of Hospital Services, P.O. Box 2060, Cape Town, before the closing date for the receipt of applications.

Applications must be made in duplicate on the prescribed form, Staff 23, which together with details as regards conditions of service and transport facilities, is obtainable from the Staff Clerk, Room 309, South Africa House, Trafalgar-square, London, W.C.2.

The completed application forms must be addressed to the Director of Hospital Services, P.O. Box 2060, Cape Town, South Africa, and must reach him not later than 9th February, 1957.

Candidates must state the earliest date on which they can assume duty.

SOUTH AFRICA. DURBAN BLOOD TRANSFUSION SERVICE. Applications are invited from registered medical practitioners for the following appointments :—

MEDICAL DIRECTOR.

The inclusive emoluments of this post are £2640 p.a. and the post is not pensionable. The holder of this post will be responsible to the Committee of the Durban Blood Transfusion Service for over-all control of the Service. He should have a practical experience in the running of a blood grouping and blood processing laboratory together with administrative experience in blood bank organisation. It is desirable that the incumbent be a registered Specialist.

PATHOLOGIST.

The inclusive emoluments of this post will be of the order of £2000 p.a., depending on experience, and the post is not pensionable. Applicants should preferably be registered Specialists in pathology and the duties will consist of the laboratory control of the Blood Transfusion Service.

Part-time MEDICAL OFFICER.

The emoluments of this post will be up to £1800 p.a., dependent on experience and the proportion of time devoted to the Service. The duties consist primarily of the medical examination and bleeding of donors, both in Durban and with the Service's mobile unit.

For the information of intending applicants who are resident outside the Union of South Africa, income taxes presently payable in the Union on the above scales of remuneration are :—

Emoluments	*Married (no children)*	*Single*
£2640	£310	£376
£2000	£161	£210
£1800	£139	£171

Applications, giving full details of experience and qualifications, should be addressed to the Chairman of the Durban Blood Transfusion Service, P.O. Box 2324, Durban, on or before 15th February, 1957.

NEW ZEALAND. THAMES HOSPITAL BOARD. Thames HOSPITAL, NEW ZEALAND. Applications are invited from registered medical practitioners for the full-time appointment of ASSISTANT MEDICAL SUPERINTENDENT. It is desirable that main interests of the appointee should lie in medicine and anæsthetics. Salary in accordance with Hospital Employment Regulations as either Senior Registrar £NZ970–£NZ1130, plus board and lodging if single and furnished residence if married ; or Junior Specialist £NZ1600–£NZ1900, with residence available and heat and light and furniture at a deduction in accordance with the Regulations. Duties to commence, if possible, 1st April, 1957.

Conditions of appointment and form of application may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London, W.C.2, England, or the undersigned.

Applications addressed to the Secretary, P.O. Box 53, Thames, should be posted air-mail and close on Tuesday, 5th February, 1957. F. HOPKINSON, Secretary.

Thames Hospital Board, Thames, New Zealand.

Hospital Services : Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications invited for post of MEDICAL CHIEF ASSISTANT (half-time). There is a prospect of further work being available with a Regional Board and details will be sent to intending applicants. Salary within the Senior Registrar grade. The appointment is for 1 year with eligibility for reappointment. Candidates must hold the M.R.C.P. Diploma or the M.B. of a university.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 9th February, 1957, to KENNETH A. F. MILES, House Governor.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. SENIOR HOUSE OFFICER (anæsthetics) whole-time, resident, for 6 months from 1st March, 1957, renewable. Previous experience in anæsthesia essential. Post is recognised for the D.A. and F.F.A.R.C.S.

Applications, with copies of 2 testimonials, or names of 2 referees, to Medical Director by 19th January, 1957.

EASTERN HOSPITAL (Fevers), Homerton-grove, London, E.9. Applications for the resident post of SENIOR HOUSE OFFICER should reach the Group Secretary, Hackney Hospital, London, E.9, as soon as possible. The post, which offers good opportunities for postgraduate study, is for 1 year in the first instance ; duties may include some work in Chest Unit and E.N.T. Department.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st March, 1957. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 23rd January, 1957.

FINCHLEY CHEST CLINIC, 980, High-road, N.20. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required at above Clinic ; duties will include work at Highlands General Hospital (Chest Unit). Vacant 16th February. Good training in general medicine essential and experience in chest diseases desirable. Clinic may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Northern Group Hospital Management Committee, Royal Northern Hospital, N.7, by 24th January, 1957.

GROUP LABORATORIES OF GREENWICH AND DEPTFORD AND SEAMEN'S GROUPS. PATHOLOGICAL SENIOR HOUSE OFFICER. Vacancy in above Laboratories. Post recognised for D.Path. of Conjoint Board.

Applications, stating age, qualifications, and experience, with names of 2 referees, to Group Secretary, Seamen's Hospital, Greenwich, S.E.10.

GROUP LABORATORY, MILE END HOSPITAL, Bancroft-road, London, E.1. RESIDENT ASSISTANT PATHOLOGIST (Senior House Officer grade). Post tenable for 1 year in first instance. Previous experience an advantage but not essential. Laboratory recognised for Diploma of Pathology and is well equipped with excellent training facilities.

Applications, stating age, nationality, qualifications, experience, and copies of testimonials, to the Secretary, Stepney Group Hospital Management Committee, Raine-street, Wapping, E.1, by 17th January, 1957.

GERMAN HOSPITAL, Dalston, E.8. (General—157 Beds.) Applications are invited for the 6 months appointment, now vacant, of HOUSE PHYSICIAN (registered practitioners only) and should reach the Group Secretary, Hackney Hospital, London, E.9, as soon as possible, quoting GH/RP.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.12. Applications invited for the following posts :—

2 Whole-time NON-RESIDENT REGISTRARS (general medicine).

Whole-time NON-RESIDENT SENIOR HOUSE OFFICER (general medicine).

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 21st January.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE SURGEON required. Duties mainly orthopædic with some E.N.T. and emergency general surgery. New operating theatre, Outpatient and Casualty Department. Post recognised for Pre-registration Service.

Applications, with copies of 3 testimonials, and name and address of 1 referee, to Hospital Secretary.

HOSPITAL FOR WOMEN, Soho-square, W.1. (Affiliated to the Middlesex Hospital.) Applications are invited for a full-time post of RESIDENT SENIOR GYNÆCOLOGICAL HOUSE OFFICER, vacant on 1st April, 1957. Appointment is for 6 months but the holder can apply for an extension of 6 months. Salary in accordance with the terms laid down for medical and dental staffs, less a deduction of £150 p.a. for residential emoluments. The appointment is recognised for the M.R.C.O.G. examination.

Applications, stating age, nationality, qualifications and experience, supported by the names and addresses of 2 referees, must reach the undersigned not later than Wednesday, 16th January. D. C. EMERY, Secretary.

LAMBETH HOSPITAL, Kennington, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE SURGEON, vacant on 11th February, 1957. The successful candidate will be required to carry out a fortnight's locum duty starting 28th January, 1957.

Application forms from the Physician-Superintendent.

LEWISHAM GROUP LABORATORY, LEWISHAM HOSPITAL, London, S.E.13. Applications are invited for the resident post of SENIOR HOUSE OFFICER in Pathology, vacant 20th February. Salary £745 p.a., less £150 for residential emoluments.

Applications, stating age, qualifications and experience, with copy testimonials or names of referees, to Group Secretary, Lewisham Hospital, S.E.13.

LONDON CHEST HOSPITAL. Hospitals for Diseases OF THE CHEST. A vacancy occurs 1st March, 1957, for RESIDENT SURGICAL OFFICER. Appointment for 6 months, with prospect of renewal. Post graded as Senior House Officer or Registrar, according to qualifications and previous surgical experience.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 18th January.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. PÆDIATRIC HOUSE PHYSICIAN (recognised for D.C.H.), vacant early in February. Not pre-registration. The post entails routine ward and outpatient work as well as experience with neonates and includes general and casualty duties.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. SENIOR HOUSE OFFICER (Casualty Department), vacant 8th February. Recognised for F.R.C.S. 6 months resident appointment and may then be renewed. Salary £745 p.a., less £150 p.a. for residence.

Apply to Secretary.

METROPOLITAN EAR, NOSE AND THROAT HOSPITAL AT ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. E.N.T. REGISTRAR, vacant February, 1957. Candidates should have had considerable E.N.T. experience and possess the F.R.C.S. or the D.L.O. Candidates may visit the Hospital by arrangement.

Applications (5 copies) to be submitted by 25th January, 1957, on forms obtainable from, and returnable to, Group Secretary (L.173), Fulham and Kensington Hospital Management Committee, 5, Collingham-gardens, London, S.W.5.

METROPOLITAN HOSPITAL, Kingsland-road, E.8. (General—146 Beds.) Applications are invited for the pre-registration posts of 2 HOUSE SURGEONS now vacant.

Applications, stating age, nationality, qualifications or probable date of qualification and experience with copies of 3 recent testimonials, to the Hospital Secretary, as soon as possible.

MILE END HOSPITAL, Bancroft-road, London, E.1. (484 Beds.) HOUSE SURGEON (pre- or post-registration). Post vacant 6th February, 1957.

Application forms obtainable from Physician-Superintendent, should be returned by 18th January, with copies of not more than 3 testimonials.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of REGISTRAR (whole-time) to the Lysholm X-ray Department at The National Hospital, Queen-square, W.C.1. This post carries the grade of Registrar. Applicants should hold a Diploma in Diagnostic Radiology and have had experience in general radiology. The appointment will be for 6 months in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 2nd February, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of REGISTRAR (non-resident) at The National Hospital, Queen-square, W.C.1, for work in the Outpatients Department. This post carries the grade of Registrar. The appointment will be for 1 year in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 31st January, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1. This post carries the grade of Registrar. The appointment will be for 1 year and will be renewed in exceptional circumstances.

Applications, with names of 3 referees, to be sent to the undersigned not later than 31st January, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of PSYCHIATRIC REGISTRAR (non-resident) at The National Hospital, Queen-square, W.C.1. This post carries the grade of Senior Registrar. The appointment will be for a period of 1 year in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 31st January, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited for the post of RESIDENT HOUSE PHYSICIAN at Maida Vale Hospital for Nervous Diseases, London, W.9. Grading as Senior House Officer or Registrar, according to experience. Appointment for 6 months, renewable. Preference will be given to a candidate holding a higher degree.

Applications, with copies of 3 recent testimonials, should be addressed to the Secretary, at Maida Vale Hospital, W.9, by 28th January, 1957.

NEASDEN HOSPITAL, Brentfield-road, Neasden, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time MEDICAL REGISTRAR (resident) required at Neasden Hospital (Infectious Diseases), for 1 year in the first instance, renewable. Experience in infectious diseases and children's diseases an advantage. The Hospital is a Regional Centre for poliomyelitis, and there are facilities for postgraduate studies. The Hospital may be visited by appointment with the Physician-Superintendent.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 22nd January, 1957.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD AND THE BOARD OF GOVERNORS OF ST. BARTHOLOMEW'S HOSPITAL, E.C.1. SENIOR REGISTRAR in Psychiatry under a Joint Training Scheme. Appointment at Severalls Hospital (resident or non-resident) for 2–3 years and subsequently at St. Bartholomew's Hospital, E.C.1, and associated Inpatient Psychiatric Unit. Appointment subject to annual review.

Application forms from Secretary, North East Metropolitan Regional Hospital Board, 11a, Portland-place, W.1, to be returned by 26th January, 1957.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

ORTHOPÆDIC AND ACCIDENT REGISTRAR (resident or non-resident near Hospital), St. Margaret's Hospital, Epping, Essex. Recognised for F.R.C.S.

REGISTRAR in Obstetrics and Gynæcology (resident), Hackney Hospital, Homerton High-street, E.9.

ANÆSTHETIC REGISTRAR (resident), Bethnal Green Hospital, Cambridge Heath-road, E.2. Recognised for F.F.A.R.C.S.

SURGICAL REGISTRAR (resident), Poplar Hospital, E.14. Recognised for F.R.C.S.

REGISTRAR in Surgical Tuberculosis (resident or non-resident), Black Notley Hospital, near Braintree, Essex. Recognised for F.R.C.S.

Appointments subject to review after 1 year.

Application forms from Secretary, 11a, Portland-place, W.1, to be returned by 26th January, 1957.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. SENIOR HOUSE OFFICER for Thoracic Surgical Unit, resident, required. 6 months appointment with possible extension to 1 year. Recognised for F.R.C.S. Offers experience in all types of tuberculous and non-tuberculous thoracic surgery.

Applications, stating age, nationality, qualifications, experience with copies of recent testimonials and/or names of 2 referees, to Secretary of Hospital.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. HOUSE SURGEON (resident), not pre-registration, vacant 21st January, 1957. Post recognised for F.R.C.S.

Applications, stating age, qualifications, &c., with names and addresses of 2 referees, to Secretary at above address.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. HOUSE OFFICERS (2). 1 appointment will be made for 2 consecutive periods of 6 months commencing 1st March, 1957. First period as House Physician at Shadwell, second as House Surgeon at Banstead (3 months) and Casualty Officer at Hackney-road (3 months). 1 appointment for 6 months only from 1st March, 1957. First 3 months as House Surgeon (Shadwell) and second 3 months as Casualty Officer (Hackney-road).

Application forms may be obtained from the Secretary at Hackney-road and should be returned with copies of not more than 3 testimonials on or before 25th January, 1957.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE PHYSICIAN (third post) for 6 months commencing 18th February, 1957.

Applications, with the names of 2 referees, to Hospital Secretary by 26th January, 1957.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of SENIOR RESIDENT ANÆSTHETIST. Applicants must be registered medical practitioners. The appointment is for 6 months from 1st April, 1957, with duties at the North Western Branch and Hampstead General Hospital. Salary in accordance with the Ministry of Health scale for Senior House Officers.

Application forms may be obtained from the Hospital Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 2nd February, 1957.

ROYAL FREE HOSPITAL GROUP. Applications are invited from registered medical practitioners for the post of JUNIOR RESIDENT ANÆSTHETIST. The appointment is for 6 months, duties to commence on 1st April, 1957. Salary and conditions of service in accordance with the Ministry of Health scale for House Officers.

Application forms may be obtained from the Hospital Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 2nd February, 1957.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of RESIDENT PATHOLOGIST (House Officer), vacant 1st March, 1957, from registered Men and Women practitioners. The post is for 6 months, renewable for a further 6 months. Salary and conditions of service in accordance with the scale laid down by the Ministry of Health for House Officers.

Application forms may be obtained from the Hospital Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 2nd February, 1957.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the post of REGISTRAR to the E.N.T. Department of the Royal Free Hospital. The appointment is for 1 year in the first instance, duties to commence as soon as possible.

Application forms may be obtained from the Hospital Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 2nd February, 1957.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1, in association with the Institute of Laryngology and Otology. Applications are invited for a post of REGISTRAR or alternatively SENIOR HOUSE OFFICER. A higher surgical qualification is required for the former grading and at least the Primary F.R.C.S. for the latter. Considerable clinical experience in general surgery and in this Specialty is required for either post. The appointment will be in accordance with the terms and conditions of service for the appropriate grade in the National Health Service.

Applications, giving full information and the names of 2 referees, should be sent to the House Governor by 8th February, 1957.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1, with which is associated the Institute of Laryngology and Otology (University of London). General Practitioner CLINICAL ASSISTANTS and OUTPATIENT ASSISTANTS. These appointments give those engaged in general practice who are able to attend for 2 sessions weekly over a period of 15 months commencing in March, 1957, the opportunity of widening their clinical experience in the Specialty. At the end of 3 months' training period the holders will be appointed as Outpatient Assistants with remuneration under paragraph 10 (*b*) of the National Health Service terms and conditions of service.

Further particulars may be obtained from the House Governor.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (581 Beds). Applications are invited for the post of HOUSE PHYSICIAN (general), pre-registration.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, to be forwarded to Hospital Secretary immediately.

ST. JAMES' HOSPITAL, Balham, S.W.12. South West METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Radiology. Post vacant 1st February. Diploma desirable.

Application forms obtainable from Group Secretary, Wandsworth Hospital Group, at above address, to be completed and returned by 26th January. (0125.)

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. Applications are invited from registered or provisionally registered medical practitioners for the post of HOUSE PHYSICIAN for 6 months commencing 30th January, 1957.

Applications, with 2 recent testimonials, to be sent to the Hospital Secretary by 26th January, 1957.

ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. Qualified medical practitioner invited to apply for the vacancy of HOUSE SURGEON. Provisionally registered candidates eligible. Appointment recognised for F.R.C.S. Appointment commences 1st February, 1957, is resident and limited to 6 months.

Applications by 21st January, 1957, on forms obtainable from the Hospital Secretary (L.174).

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified practitioners for the post of CASUALTY SURGEON. Candidates must have held an appointment as House Surgeon at this Hospital or at another hospital approved by the Board of Governors. The appointment is for a first period of 6 months, with effect from 1st March, 1957. Remuneration at Senior House Officer rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 22nd January, 1957.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified medical practitioners for the post of REGISTRAR to the Department of Chemical Pathology. The appointment is for a first period of 12 months as from a date to be arranged.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, by 22nd January, 1957.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. RESIDENT SURGICAL OFFICER (Senior Registrar grade) required for St. Peter's Hospital on 1st April, 1957. Applications invited from Male candidates on the British register who have completed their training in general surgery. Appointment for 6 months, with opportunity for a further 6 months if recommended. Candidates should be prepared to spend 1 year at the Hospital if required.

Applications (12 copies), and the names of 3 referees, should reach the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2. by 31st January, 1957.

ST. THOMAS'S HOSPITAL, London, S.E.1. Research REGISTRAR to the Department of Psychological Medicine for a period of 1 year. Successful candidate to devote whole-time to clinical research in psychiatric treatment.

Applications, naming 2 referees, to the Clerk of the Governors by 25th January, 1957.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time JUNIOR HOSPITAL MEDICAL OFFICER for the Blood Transfusion Service in the South West and South East Metropolitan Regions. Duties will be divided between blood collection from donors in the area covered by the South West and South East Metropolitan Regional Hospital Boards and laboratory work, including research, at the South London Blood Transfusion Centre, Stanley-road, Sutton, Surrey. The appointment offers ample scope in serology and hæmatology and all aspects of blood transfusion. Salary scale £775–£50–£1075 p.a.

Applications (2 copies), giving date of birth, qualifications, experience and the names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 26th January, 1957. Applicants may visit Blood Transfusion Centre by arrangement with the Medical Director there.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 8th April, 1957, for a RESIDENT SENIOR DENTAL HOUSE SURGEON. The post is recognised for the Fellowship in Dental Surgery, Royal College of Surgeons. Experience is given in both oral surgery and orthodontics.

Further particulars and form of application, which must be returned not later than 4th February, 1957, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies for the following Senior House Officers on 15th April, 1957.

1 HOUSE PHYSICIAN.
1 HOUSE SURGEON.

Further particulars and form of application which must be returned not later than Monday, 4th February, 1957, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of REGISTRAR in the Radiotherapy Department.

Applications, with the names of 2 referees, to Administrator and Secretary by 22nd January, 1957.

WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1. Applications invited for post of REGISTRAR in Departments of Clinical Pathology and Bacteriology for 1 year in first instance from 1st March, 1957.

Applications (5 copies), with names of 2 referees, to House Governor by 26th January.

WHITTINGTON HOSPITAL, London, N.19. Registrar required for E.N.T. Department (30 Beds). Post recognised for F.R.C.S. and D.L.O. Vacant now. Considerable experience in laryngology desirable as the post is a responsible one. Department takes part in postgraduate teaching. Hospital may be visited by direct appointment. Post is non-resident but successful candidate will be required to sleep in the Hospital on alternate nights and alternate week-ends.

Application forms obtainable from, and returnable to, the Group Secretary, 46, Cholmeley-park, Highgate, London. N.6, by 22nd January, 1957.

WILLESDEN CHEST CLINIC, Pound-lane, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR required 1st April, 1957. Duties include clinic and district work, also personal supervision of 20 Beds in Neasden Hospital; and some duties Central Middlesex Hospital. Experience required in general medicine, and some experience in treatment of pulmonary tuberculosis. Preference to candidates with higher qualifications. Further details from Physician to clinic.

Application forms obtainable from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 23rd January, 1957.

WIMBLEDON HOSPITAL, Thurstan-road, Copse Hill, S.W.20. RESIDENT HOUSE SURGEON (not pre-registration) vacant now. Salary £525.

Applications, giving age, qualifications, &c., with names and addresses of 2 referees, to the Secretary at above address.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOSPITAL. SENIOR HOUSE OFFICER required from 1st February, 1957 (mainly surgical). Post recognised for F.R.C.S. Resident.

Applications, stating age and experience, &c., to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cards.

ACCRINGTON. VICTORIA HOSPITAL. (114 Beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required for 8th February, 1957. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Applications to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE HOSPITAL. SENIOR HOUSE OFFICER in the Rheumatism Research Centre required, with additional duties in the Area Department of Medicine. The post offers good opportunities for clinical research.

Applications, with names of 2 referees, to the Administrative Officer.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON required. Recognised pre-registration appointment; the post can be taken up immediately.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BATH. ST. MARTIN'S HOSPITAL. Resident Anæsthetist (Senior House Officer) required at above Hospital on 31st January, 1957. Facilities for attending evening lectures, when held, at Bristol for the higher Diploma in Anæsthetics examination will be made available. The Hospital is recognised under F.F.A.R.C.S. and D.A. regulations.

Applications, stating age, qualifications and experience with names of 2 referees, should be forwarded to the Secretary, Bath Hospital Management Committee, Manor Hospital, Combe Park, Bath, as soon as possible.

BATLEY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical) at the above Hospital which has 99 Beds and deals with orthopædic surgery, general surgery, E.N.T., and ophthalmology. The person appointed should preferably have had experience in orthopædic surgery or should desire to pursue this specialty. Married accommodation can be provided, if necessary, and it is hoped that an appointment can be made for a term of 1 year.

Applications, including testimonials, to be forwarded to the Administrative Officer at the Hospital as soon as possible.

BEBINGTON, CHESHIRE. CLATTERBRIDGE HOSPITAL. (819 Beds.) CENTRAL WIRRAL GROUP. JUNIOR HOSPITAL MEDICAL OFFICER (casualty/orthopædics), resident, or LOCUM required. Salary in accordance with current terms and conditions of service—i.e., £775–£50–£1075 p.a., less £170 p.a. for residence.

Application forms from Group Secretary to be returned as soon as possible.

BEDFORD GENERAL HOSPITAL. (439 Beds.) House SURGEON required. Pre- or post-registration. Recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute Surgical Units.

Inquiries and applications, with copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) HOUSE PHYSICIAN. House Officer or Senior House Officer grading according to experience. Pre-registration post, but fully qualified practitioners may apply.

Apply Group Secretary.

BIRMINGHAM. THE SKIN HOSPITAL, INPATIENTS DEPARTMENT, George-road, BIRMINGHAM, 15. SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience. Modern well-equipped Inpatients Department, providing facilities for study of skin diseases. Required to assist Consultant at outpatients clinics.

Applications, with copies of 2 recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

Resident Whole-time SENIOR REGISTRAR in Psychiatry, St. Matthew's Hospital, Burntwood (1234 Beds). Experience specialty and D.P.M. required.

Whole-time SENIOR REGISTRAR in Radiology, Selly Oak Hospital, Birmingham (1059 Beds). Diploma in Diagnostic Radiology essential. Department serves large General Hospital and group of subsidiaries (including children's, maternity, eye and E.N.T.) and provides experience throughout whole range of specialty.

Successful candidates may subsequently be required to spend not more than 2 years in a selected hospital of the United Birmingham Hospitals under the interchange scheme for Senior Registrars agreed between the 2 Boards.

Application forms from Secretary, 10, Augustus-road, Birmingham, 15, to be returned by 28th January, 1957.

BIRMINGHAM REGIONAL HOSPITAL BOARD.
(1) **Highcroft Hall Group 7, Highcroft Hall Hospital, Birmingham, 23**

REGISTRAR (psychiatry). All modern forms of treatment. Opportunities for outpatients clinic work. House available.

(2) **West Bromwich Group, Edward-street, West Bromwich**

REGISTRAR (general surgery). Recognised for F.R.C.S. Duties in Casualty Department. Opportunity deputise for Resident Surgical Officer in general surgery work. Experience specialty required. Resident.

Application forms from Group Secretaries, to be returned by 21st January, 1957.

BIRMINGHAM (near). MARSTON GREEN MATERNITY HOSPITAL, Berwicks-lane, MARSTON GREEN, near BIRMINGHAM. HOUSE SURGEON (obstetrics) required, vacant 1st March, 1957. 121 obstetrics and 10 gynæcological beds. Recognised for Diploma and Obstetric part of M.R.C.O.G. Premature Baby Unit. Hospital affiliated to Birmingham Medical School for training of students.

Detailed applications, with copies of 3 recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. MONYHULL HALL HOSPITAL, Kings HEATH, BIRMINGHAM, 14. BIRMINGHAM (NO. 8) HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident). This mental deficiency hospital offers good experience in all branches of the investigation and training of mental defectives. In addition there are opportunities to gain experience with E.S.N. children and in child psychiatry at St. Francis Residential Special School, which is associated with the Hospital. There is a large, well-developed Psychological Department staffed by 3 Clinical Psychologists. The Hospital is recognised for the first-year of the training for the D.P.M. Accommodation for a single person is available.

Applications, giving full personal particulars, qualifications and experience, together with the names and addresses of 2 referees, to be sent to the Medical Superintendent at the above Hospital within 2 weeks of the appearance of this advertisement.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (Senior House Officer grade). Post vacant mid-February.

Applications, stating age, qualifications, nationality and copies of testimonials, to Medical Superintendent.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. The following resident appointments are available for the 6 months period commencing 7th January, 1957. Recognised for pre-registration candidates but registered medical practitioners may apply.

The Queen Elizabeth Hospital

HOUSE SURGEON to the Ophthalmic Department.
HOUSE SURGEON to the E.N.T. Department.

The General Hospital

HOUSE SURGEON to the Casualty Department.
HOUSE SURGEON to the E.N.T. Department.

The Children's Hospital

HOUSE SURGEON. This post rotates between the three main surgical wards to give experience in all branches of surgery.

Forms of application may be obtained from the undersigned.

G. A. PHALP,
Secretary and Principal Administrative Officer.
The United Birmingham Hospitals, The Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of SENIOR PSYCHIATRIC REGISTRAR (Senior Registrar grade) to the United Birmingham Hospitals. The appointment will be for 1 year in the first instance, subject to annual review. The successful candidate may subsequently be required to spend not more than 2 years in a selected Hospital of the Birmingham Regional Hospital Board, in accordance with an arrangement for the interchange of Registrars agreed between the 2 Boards. Candidates should hold the D.P.M., and preferably M.R.C.P. Furnished flat available.

Application forms to be obtained from the Secretary, The United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned by 26th January, 1957.

BIDEFORD AND DISTRICT HOSPITAL. (51 Beds.) Applications invited for post of HOUSE OFFICER, now vacant. Flat available for married officer.

Applications, stating names of 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON, which is now vacant. Favourable consideration will be given to suitable applicants for subsequent House Physician appointments. The appointment is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Obstetrics and Gynæcology at the above Hospital (494 Beds, including 36 obstetrical and 22 gynæcological beds). The post, which is resident, becomes vacant on 20th March, 1957, is subject to review after 1 year, and is recognised for the M.R.C.O.G.

Forms of application are obtainable from the Group Secretary, Hospital Management Committee Office, Royal Victoria Hospital, Gloucester-road, Boscombe, and should be returned to him duly completed within 7 days of the appearance of this advertisement.

BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. BOURNEMOUTH CHILDREN'S UNIT. Applications are invited for the post of PÆDIATRIC SENIOR HOUSE OFFICER to the above Unit, situated at the Christchurch Hospital. Duties include conduct of an Infant Welfare Centre. The post is recognised for the D.C.H. and will become vacant on 10th March, 1957.

Applications, with copies of testimonials, should be sent to the Hospital Secretary, Christchurch Hospital, Hants, within 7 days of the appearance of this advertisement.

BOURNEMOUTH AND EAST DORSET GROUP OF HOSPITALS. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Anæsthetics for the above Group, with duties mainly at the Christchurch Hospital. This is a new post which will become available in March, 1957, and is consequent upon the opening of 56 surgical beds at Christchurch Hospital. The post is tenable for 1 year in the first instance and applicants should have had considerable experience in anæsthesia. It will be an advantage if the successful candidate is willing to be resident at Christchurch Hospital.

Forms of application are obtainable from the Group Secretary, Hospital Management Committee Office, Royal Victoria Hospital, Gloucester-road, Boscombe, Bournemouth, and should be returned to him within 14 days of the appearance of this advertisement.

BRADFORD, YORKS. ROYAL EYE AND EAR HOSPITAL. (105 Beds.) SENIOR HOUSE OFFICER required for E.N.T. Department of 56 Beds. Recognised for D.L.O. and F.R.C.S. Post vacant 1st February, 1957. Salary £745 p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to Secretary, Royal Infirmary, Bradford.

BRIDGEND GENERAL HOSPITAL, Bridgend. (381 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (general surgery). Appointment available 1st February, 1957. This Hospital is recognised for the F.R.C.S.

Applications, stating age, qualifications, previous experience and naming 2 referees, to be addressed to the Group Secretary, Mid Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

BRIDGEND GENERAL HOSPITAL, Bridgend. (381 Beds.) Applications are invited from pre-registration and qualified medical officers for the post of HOUSE SURGEON. Appointment available 1st February, 1957, and tenable for 6 months. This Hospital is recognised for the F.R.C.S. and approved by the General Medical Council for Pre-registration Service under Section 2 of The Medical Act, 1950.

Applications, naming 2 referees, to be addressed to the Group Secretary, Mid Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer), non-resident, required 28th January, 1957, at the above Hospital. Recognised for F.R.C.S.

Applications as locum or permanent post, stating usual particulars and the names of 2 referees, to the Administrative Officer.

BRISTOL. SOUTHMEAD GENERAL HOSPITAL GROUP MANAGEMENT COMMITTEE. Required at Southmead Hospital (570 Beds, including 133 maternity) RESIDENT SENIOR HOUSE OFFICER (urological surgery) for 6 or 12 months commencing 1st February, 1957. Post recognised for F.R.C.S. examination.

Applications to be made on forms to be obtained from the undersigned. C. C. HANCOCK, Group Secretary.

Southmead Hospital, Bristol.

BURTON GENERAL HOSPITAL. (250 Beds.) Junior HOSPITAL MEDICAL OFFICER ANÆSTHETIST (resident or non-resident) required at the above Hospital.

Applications to Group Secretary, General Hospital, Burton upon Trent, as soon as possible.

BURTON UPON TRENT. THE GENERAL HOSPITAL. HOUSE SURGEON (orthopædics) required at the above Hospital. Post recognised for the F.R.C.S.

Applications to Group Secretary as soon as possible.

CARDIFF (near). ELY HOSPITAL, Ely, Cardiff. Junior HOSPITAL MEDICAL OFFICER (Male or Female). This post is available at the above 515-Bedded hospital (300 mental defectives and 215 senile psychotics) in close proximity to Cardiff. Salary £775–£50–£1075 p.a. Conditions of service as prescribed by the Medical Whitley Council. There is no residential accommodation available.

Applications, giving the names and addresses of 3 referees, to be sent to the Medical Superintendent.

CARDIFF. ST. DAVID'S HOSPITAL. Senior House OFFICER (Resident) required in Geriatric Unit (200 Beds) at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in General Surgery at the Cardiff Royal Infirmary. Non-resident post, commencing 1st March, 1957.

Application forms are available from the Secretary to the Board, at the Cardiff Royal Infirmary, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

COLCHESTER. SEVERALLS HOSPITAL. Junior HOSPITAL MEDICAL OFFICER required (resident or non-resident). Commencing salary £775 p.a., rising to £1075 p.a. Furnished accommodat on available for a single officer. There will be scope for work in the use of modern psychiatric methods in the wards.

Applications, with names of 2 referees, should be forwarded to the Medical Superintendent.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (185 Beds)

HOUSE OFFICER (surgical). First, second, third or pre-registration post, tenable for 6 months. Recognised for F.R.C.S.

Black Notley Hospital, Braintree (516 Beds)

Posts of HOUSE SURGEON and HOUSE PHYSICIAN. The successful applicant will serve 6 months as House Surgeon followed by 6 months as House Physician. First, second, third or pre-registration posts. Surgical post includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S. Medical post includes duties in medical and pædiatric wards.

HOUSE PHYSICIAN. Duties in medical and pædiatric wards. First, second, third or pre-registration post, tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, 14, Pope's-lane, Colchester.

COTTINGHAM (near HULL). CASTLE HILL HOSPITAL. HULL B HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (resident) to work in Major Thoracic Surgery Unit. Accommodation available for single person only at present. The Unit has 50 Beds for all types of thoracic surgery, including tuberculosis and non-tuberculosis, œsophageal and cardiac.

Application forms from Group Secretary, De la Pole Hospital, Willerby, East Yorkshire.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (surgical), which will become vacant on 8th February next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (medical), which will become vacant on 8th February next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (711 Beds.) ANÆSTHETIC REGISTRAR. Post vacant 21st April, 1957. Hospital recognised for F.F.A.R.C.S. and D.A.

Forms of application, to be returned by 26th January, may be obtained from the Group Secretary at above address.

CHELMSFORD. ST. JOHN'S HOSPITAL. (65 surgical beds.) Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (Senior House Officer grade). The post which becomes vacant on 13th February, 1957, is recognised for the F.R.C.S. and the successful candidate will gain excellent experience in general surgery, with good opportunity for preparation for higher qualifications. A House Surgeon is in residence.

Applications, stating age, nationality, present appointment and previous appointments with dates, together with recent testimonials, to the Group Secretary, Chelmsford Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (430 Beds.) RADIOLOGICAL REGISTRAR. 1 of the 2 Registrar posts in the Diagnostic X-ray Department will become vacant at the end of February, 1957. Applicants must possess at least the D.M.R.(D.), Part I. The department may be visited by arrangement with the Senior Radiologist (Ottershaw 441). Hospital within easy reach of London.

Application forms may be obtained from the Group Secretary, Woking and Chertsey Hospital Management Committee, "Huntington," Guildford-road, Chertsey, Surrey; completed forms must be returned by 2nd February, 1957.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (430 Beds.) Applications are invited for the post of SENIOR MEDICAL REGISTRAR. The Hospital may be visited by arrangement with Physician-Superintendent (Telephone : Ottershaw 44F).

Application forms can be obtained from the Group Secretary, Woking and Chertsey Group Hospital Management Committee, "Huntington," Guildford-road, Chertsey, Surrey. Closing date 26th January.

CHICHESTER, SUSSEX. ST. RICHARD'S HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN (recognised for pre-registration) for 6 months only in the first instance. Vacant middle February, 1957.

Applications, stating age, qualifications and experience, and giving names of 2 persons to whom reference may be made, should be sent to the Surgeon-Superintendent.

CROYDON. MAYDAY HOSPITAL. (611 Beds.) Croydon GROUP HOSPITAL MANAGEMENT COMMITTEE. JUNIOR CASUALTY OFFICER (Senior House Officer grade). Applications are invited for post which is vacant on 22nd January. Recognised for Final F.R.C.S. examination. Particularly good for gaining experience in orthopædics and fracture work.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, Croydon.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited for the post of HOUSE OFFICER (general medicine and pædiatrics) vacant 1st February, 1957.

Applications, giving details of age, experience and qualifications together with the names of 2 referees, to the Administrative Officer at the Hospital.

DERBY. CITY HOSPITAL. House Surgeon (pre-registration) or SENIOR HOUSE OFFICER (surgical). Post recognised for F.R.C.S. Vacant 10th March, 1957.

Apply, stating full details with copies of 2 recent testimonials, to Medical Superintendent.

DERBY. DERBYSHIRE ROYAL INFIRMARY. House SURGEON (general surgery) required early February, 1957. Pre-registration candidates eligible.

Applications, with copies of 2 recent testimonials, to be sent to Secretary.

DONCASTER ROYAL INFIRMARY. (Recognised under the regulations for the Fellowship and D.L.O.) Applications are invited for the post of SENIOR HOUSE OFFICER in the E.N.T. Department. Post vacant now.

Applications to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. Applications are invited for the post of SENIOR HOUSE OFFICER in the Orthopædic Department. The post is recognised under the Fellowship regulations.

Applications to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DRIFFIELD, YORKSHIRE. EAST RIDING GENERAL HOSPITAL. (247 Beds.) HOUSE PHYSICIAN, vacant early January. Approved pre-registration post. Fully qualified practitioners may apply. Duties include acute and chronic medicine. Good general experience for first house appointment.

Apply Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DRIFFIELD, YORKSHIRE. NORTHFIELD SANA-TORIUM. (78 Beds.) SENIOR HOUSE PHYSICIAN, vacant now. Offers experience all branches of tuberculosis within the Group, including surgery, M.M.R., and clinics. Time for study. Ex-patients welcome. £150 for full residence.

Applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (surgical). Post now vacant.
SENIOR HOUSE OFFICER (casualty). Post now vacant.
HOUSE OFFICER (surgical), pre-registration. Post vacant January, 1957.

Apply, Group Secretary, Guest Hospital, Dudley.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) MEDICAL REGISTRAR, Papworth Hospital, Cambridgeshire (174 medical beds—27 thoracic surgical beds). Post provides wide range of experience in tuberculosis and other chest diseases. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Physician-Superintendent.

(2) REGISTRAR in Obstetrics and Gynæcology, Peterborough Group of hospitals. Unit consists of 73 obstetric beds and a busy Gynæcological Department. Recognised for M.R.C.O.G. in Obstetrics. Appointment for 1 year, renewable for second year. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Memorial Hospital, Peterborough.

Applications, stating age, experience and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 21st January, 1957.

EAST CUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments for the 6 months period commencing 1st February, 1957.

Cumberland Infirmary, Carlisle (330 Beds)

1 HOUSE OFFICER (general medicine).
2 HOUSE OFFICERS (general surgery). Recognised for F.R.C.S. examination.
1 HOUSE OFFICER (gynæcology with some obstetrics).

City Maternity (65 Beds) and **City General** (188 Beds) **Hospitals, Carlisle**

1 HOUSE OFFICER (obstetrics and gynæcology). Recognised for the D.Obst.R.C.O.G. examination.

All the above posts are recognised for pre-registration purposes.

Applications, stating age and giving details of education, training and experience, together with the names of 2 referees, should be sent to the Group Secretary, Cumberland Infirmary, Carlisle.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT SENIOR CASUALTY HOUSE OFFICER required at above Hospital. Post recognised for F.R.C.S. purposes.

Apply immediately, stating age, nationality, qualifications and experience, together with the names and addresses of 2 referees, to Group Secretary, Edgware General Hospital.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT HOUSE PHYSICIAN for Thoracic and Dermatological Departments. Duties to include "taking of acute general medical cases." 6 months appointment. Post vacant 18th February, 1957.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 26th January, 1957.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from pre-registration and registered medical practitioners for the appointment of HOUSE PHYSICIAN (2) vacant 24th February, 1957, and 8th March, 1957, respectively.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 19th January, 1957.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 5th February. Pre-registration post recognised for F.R.C.S.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sen as soon as possible to Group Secretary at above address.

EPSOM GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for Whole-time REGISTRAR in Chest Medicine to the Epsom and Dorking Chest Clinics. Immediate vacancy. Duties will include sessions at 1 or both clinics. Additionally person appointed will be Registrar at Cheam Sanatorium where there are 53 Beds for the treatment of cases of pulmonary tuberculosis, and will have the day-to-day care of patients under the various Consultants concerned. Successful candidate will be required to live within easy access of Cheam Sanatorium. Applicants may visit Units by arrangement with Consultant Chest Physician.

Application forms may be obtained from Group Secretary, Epsom District Hospital, Dorking-road, Epsom (send stamped addressed foolscap envelope), for completion and return within 14 days.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON (approved pre-registration, first or second post), vacant 2nd February, 1957. Duties with a General Surgical Unit. Post recognised by the Royal College of Surgeons. 6 months appointment.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital, The Ridgeway, Enfield.

GLASGOW. ROBROYSTON HOSPITAL. There are immediate vacancies for a JUNIOR HOSPITAL MEDICAL OFFICER and a Locum JUNIOR HOSPITAL MEDICAL OFFICER, preferably non-resident. The work carried out consists mainly of tuberculous pulmonary disease, though substantial units exist for skeletal and for urological tuberculosis. A small unit for acute respiratory disease exists, and there are also units for non-tuberculous chest diseases and for geriatrics.

Applications in writing should be forwarded immediately to Physician-Superintendent, Robroyston Hospital, Glasgow, E.3.

GLASGOW. VICTORIA INFIRMARY. Senior House OFFICER in Pathology. Applications for vacant post, tenure of which will be subject to review after 1 year, to Secretary, Board of Management for Glasgow Victoria Hospitals, 24, St. Vincent-place, Glasgow, by 25th January, 1957.

GRIMSBY GENERAL HOSPITAL. Applications are invited for CASUALTY OFFICER (Senior House Officer grade) with some E.N.T. duties. Up-to-date Medical Library and reading facilities available.

Applications, with names and addresses of 2 referees, to Hospital Secretary.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) SENIOR HOUSE OFFICER for ophthalmology and neurology. Post is vacant on 24th January. Resident accommodation is available. It is tenable for 6 months and renewable. Whitley Council terms. Recognised for both F.R.C.S. and D.O. examinations.

Apply as soon as possible, with copies of 3 testimonials, to Hospital Secretary.

HALIFAX. NORTHOWRAM HALL HOSPITAL. (108 Beds.) SENIOR HOUSE OFFICER in Chest Diseases required. Duties include attendance at busy Chest Clinic at the Royal Halifax Infirmary and non-tuberculous chest ward work. This post offers excellent facilities for the study of chest diseases and experience is available with bronchoscopies and bronchograms. Salary £745 p.a., with a deduction of £150 p.a. for board, residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. House PHYSICIAN required in General Medicine. Post vacant 1st February, 1957.

Apply to the Group Secretary, Royal Halifax Infirmary, Halifax.

HAREFIELD HOSPITAL, Harefield, Middlesex. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR required at above Hospital. Previous experience in general medicine and in the treatment of tuberculosis essential. The Hospital has approximately 450 Beds for the treatment of tuberculosis in all its forms, a non-tuberculosis Thoracic Surgical Unit of 90 Beds, and 100 general medical and surgical beds.

Application forms obtainable from, and returnable to, the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 19th January, 1957.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (medical), which will become vacant on 1st February next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (surgical), which will become vacant on 1st February next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration) required.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HEMEL HEMPSTEAD, HERTFORDSHIRE. ST. PAUL'S AND WEST HERTS HOSPITALS. HOUSE PHYSICIAN (pre-registration).

Applications, giving full details and enclosing copies of 2 recent testimonials, should be sent to the Secretary, St. Paul's Hospital, Hemel Hempstead, Herts, at once.

HENDON GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT OBSTETRIC HOUSE SURGEON required at Bushey Maternity Hospital, Bushey Heath, Herts (50 Beds). Duties include antenatal and other clinics at the Edgware General Hospital, Edgware, Middlesex. Post vacant 15th February, 1957. 6 months appointment. Post recognised for D.Obst.R.C.O.G. and for pre-registration purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Edgware General Hospital by 26th January, 1957.

HERTFORD COUNTY HOSPITAL. (Hospital situated 21 miles from London.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Paediatrician and Ophthalmic Consultant. Salary £745 p.a., less £150 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence immediately.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.) CASUALTY OFFICER. Whole-time duties under Medical Director will include dealing with casualties and admissions to Hospital and such other duties as may be required. Post recognised for F.R.C.S. Junior Hospital Medical Officer scale.

Apply, with copies of 3 recent testimonials, to Medical Director by 22nd January.

HORNCHURCH. ST. GEORGE'S HOSPITAL. Junior HOSPITAL MEDICAL OFFICER (resident) required from 1st January, 1957, at this Hospital which accommodates 404 chronic sick patients. The post offers excellent geriatric experience.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

HOUNSLOW HOSPITAL. (General Acute—81 Beds.) Applications are invited for the appointment of RESIDENT CASUALTY OFFICER (Senior House Officer grade) recognised for F.R.C.S. examination. Post vacant 10th February, 1957. Salary £745 p.a., less £150 p.a. for residence, &c.

Applications, stating age, qualifications, experience, with copies of 3 recent testimonials or names for reference, to the Hospital Secretary, Hounslow Hospital, Staines-road, Hounslow, Middlesex.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duties on 23rd January, 1957. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. RESIDENT SENIOR HOUSE OFFICER required as from 18th February, 1957. The Officer appointed will supervise the House staff, and also be in charge of the Casualty Department. Salary and emoluments according to national scale.

Applications, with testimonials, should be sent to the Hospital Secretary.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE SURGEON (recognised for the F.R.C.S. examinations). There are 69 general surgical beds and some supervision is required of 17 gynaecological beds. Salary £745, less emoluments. Post vacant 1st February.

Applications, with 2 recent testimonials, to the Hospital Secretary.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (medical). Post recognised for pre-registration purposes. The selected candidate will be required to look after medical and paediatric cases and may be called upon to give emergency anæsthetics. Post vacant early February.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

ILFORD. KING GEORGE HOSPITAL. (General Hospital—211 Beds.) There will be a vacancy for a SENIOR HOUSE OFFICER (Orthopædic Department) at above Hospital on 30th January, 1957. Salary will be at the rate of £745 p.a., less emoluments. Recognised for F.R.C.S.

Applicants should have been registered not less than 1 year and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary, Ilford
and Barking Group Hospital Management Committee.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to 2 Consultant General Surgeons. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Heath ROAD WING, IPSWICH. (274 Beds.) Applications invited for post of HOUSE PHYSICIAN (pre-registration), vacant 14th February, 1957.

Applications, with full details, to the Hospital Secretary.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified Medical Officers for the posts of SENIOR HOUSE OFFICER (general surgery)—2 posts which are available on 1st and 3rd March, 1957. The posts are recognised for F.R.C.S. purposes.

Applications, stating age, qualifications and experience with 2 testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified Medical Officers for the post of SENIOR HOUSE OFFICER (orthopædic and casualty) which is available on 1st March, 1957. The post is recognised in casualty for F.R.C.S. purposes.

Applications, stating age, qualifications and experience with 2 testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) SENIOR HOUSE OFFICER (casualty). The successful applicant will work with the Specialist Orthopædic Unit. The post is recognised for F.R.C.S.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (surgical), pre-registration post. Successful applicant will work with Consultant Surgical Unit and attend Consultative Clinics. Post vacant 1st February next; tenable for 6 months. Recognised for F.R.C.S.

Applications, with names of 2 referees, to the Secretary (S), Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (medical), pre-registration post. Duties include care of acute cases under the supervision of 2 Consultant Physicians and attendance at Consultative Clinics. Post vacant 1st February next; tenable for 6 months.

Applications, with names of 2 referees, to Secretary (M), Royal Lancaster Infirmary, Lancaster.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (197 Beds.) RESIDENT HOUSE SURGEON (general surgery). Post vacant. Recognised for pre-registration and F.R.C.S. Post provides excellent experience. Good accommodation available.

Applications, with 2 recent testimonials, to Hospital Secretary.

LEICESTER ISOLATION HOSPITAL AND CHEST UNIT, Groby-road, LEICESTER. (328 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT MEDICAL REGISTRAR (chest and infectious diseases) required. Single accommodation available. Acute pyrexial conditions, tuberculosis and all forms of chest and heart diseases. Hospital has complete Thoracic Surgical Unit with medical and surgical outpatient clinics. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10, by 21st January, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LEWES (near). CHAILEY HERITAGE (Craft School and Hospital), NORTH COMMON, CHAILEY, near LEWES, SUSSEX. (300-bedded Children's long-stay Orthopædic Hospital and Hospital School.) MID-SUSSEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER. 12 months appointment. Useful experience in orthopædics and paediatrics and for candidate working for D.C.H. or contemplating School Medical Service. Should have held previous appointment. National Health Service terms and conditions.

Applications, with 2 references or recent testimonials, to Medical Administrator not later than 26th January, 1957.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited for the appointment of 2 HOUSE SURGEONS or SENIOR HOUSE OFFICERS (resident) in the Thoracic Surgical Unit for 6 months from 1st March, 1957. The appointments are recognised for pre-registration purposes and the grading will be according to the experience of the applicants appointed. Salary, House Surgeon £425–£475–£525, less £125 p.a. resident charges; Senior House Officer £745 p.a., less £150 p.a.

Application forms obtainable from the undersigned, to be returned completed not later than 26th January, 1957.

H. BLYTHE, Group Secretary.

LIVERPOOL, 20. BOOTLE HOSPITAL. Applications are invited for a post, vacant from 1st February, 1957, as SENIOR HOUSE SURGEON (general surgery).

Apply to Secretary, Walton Hospital, Liverpool, 9.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ST. PAUL'S EYE HOSPITAL. Applications are invited for a post of Locum REGISTRAR in Ophthalmology to take up duty as soon as possible for the period to 15th February, 1957.

Apply, as soon as possible, with details of age, qualifications, and experience, and the names of 2 referees, to the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. (250 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required early January at the above Hospital. The post is recognised for F.R.C.S. The Hospital may be visited by direct appointment.

Application forms obtainable from the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, and returnable as soon as possible.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. SENIOR HOUSE OFFICER for Accident Service, including duties in the Hand Infection Unit, required 1st February, 1957. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 23rd January, 1957.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months appointment. Post vacant February, 1957. Salary at the rate of £425–£525 p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £745 a year, less £150 a year for board and lodging. Post vacant February, 1957.

Applications to the Administrative Officer at the Hospital.

MID GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following Medical staff vacancies:—

Neath General Hospital, Neath (412 Beds)

SENIOR HOUSE OFFICER (pathology), vacant 24th January, 1957.

HOUSE SURGEON, vacant 1st February, 1957.

Bridgend General Hospital, Quarella-road, Bridgend (381 Beds)

HOUSE SURGEON, vacant 1st February, 1957.

HOUSE SURGEON (obstetrics and gynæcology), vacant 1st February, 1957.

Neath and Bridgend General Hospitals are recognised for the major diplomas and approved by the General Medical Council for Pre-registration Service under Section 2 of the Medical Act, 1950.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

MITCHAM. WILSON HOSPITAL, Cranmer-road, MITCHAM, SURREY. SENIOR HOUSE OFFICER (surgical). Duties mainly in Casualty Department. Post vacant 10th February.

Applications, enclosing copies of recent testimonials and the names of 2 referees, to Group Secretary, St. Helier Hospital, Carshalton, Surrey.

MORECAMBE. QUEEN VICTORIA HOSPITAL. (100 Beds.) RESIDENT SENIOR HOUSE OFFICER (obstetrics and gynæcology). Post vacant now and tenable for 1 year. Successful applicant will work with the Specialist Unit, but will be expected to relieve the Senior House Officer (surgical) during absence.

Applications, with full particulars, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for CLINICAL PATHOLOGIST (Senior House Officer grade). Resident post vacant 28th February, 1957. Non-resident post vacant 12th March, 1957. Tenable for 1 year and presents opportunities for gaining experience in all branches of clinical pathology. Previous experience in pathology not essential.

Applications, with names of 2 referees, by 21st January, 1957, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester.

MANCHESTER, 20. CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgery) at the above Hospital. This is a suitable post for candidates studying for the F.R.C.S.

Applications, stating age, qualifications, nationality, present post, experience, and the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of the appearance of this advertisement.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. The Board invite applications for the post of REGISTRAR in E.N.T. Surgery in the South Manchester Group, with principle duties at the Manchester Ear Hospital and Wythenshawe Hospital.

Applications, stating age, qualifications, present post, and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, not later than 24th January, 1957.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of REGISTRAR in General Medicine in the Ashton, Hyde and Glossop Group of hospitals.

Applications, with copies of 2 testimonials, should be forwarded to the Group Secretary, Ashton, Hyde and Glossop Hospital Management Committee, General Hospital, Ashton-under-Lyne, by 23rd January, 1957.

MANCHESTER REGIONAL HOSPITAL BOARD. RESIDENT SURGICAL REGISTRAR required beginning of February, 1957, in the Blackburn and District Group with duties mainly at Queen's Park Hospital, Blackburn (640 mainly general beds). Post recognised for F.R.C.S.

Application forms obtainable from the Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of RESIDENT SURGICAL REGISTRAR to Macclesfield District Group Hospitals, main duties Infirmary Branch, Macclesfield Hospital. Hospital recognised for F.R.C.S. regulations.

Apply immediately, with names and addresses of 2 referees, to Group Secretary, Willerby House, Cumberland-street Macclesfield.

MANCHESTER REGIONAL HOSPITAL BOARD. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of NON-RESIDENT REGISTRAR to the Neurosurgical Department at Salford Royal and the Royal Manchester Children's Hospitals. In addition to adult work the post offers exceptional opportunities for experience in pædiatric neurosurgery.

Applications, together with names and addresses of 2 referees to be sent to the Group Secretary, Salford Royal Hospital, Salford, 3, before 19th January, 1957.

NEWCASTLE GENERAL HOSPITAL. (838 Beds.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in the Department of Urology (51 Beds). This is a Regional Urological Unit and patients are admitted from a very wide area. The post offers excellent opportunities for gaining practical experience under Consultant Urological Surgeons. The Unit is self contained and includes a Urological Operating Theatre. Recognised for F.R.C.S.

Applications, together with the names of 2 referees, should be forwarded to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD. REGISTRAR ORTHOPÆDIC SURGEON (whole-time), Hexham Group of hospitals (100 orthopædic beds). Accommodation may be available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. REGISTRAR ANÆSTHETIST (whole-time) Newcastle Group of hospitals.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON to the Radiotherapy and E.N.T. Departments. This post is recognised as a pre-registration appointment. Vacant 1st February, 1957.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 16th January, 1957.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Radiotherapy Department. This post is recognised as a pre-registration appointment. Vacant 1st February, 1957.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 16th January, 1957.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON to the Gynæcological Department of 25 Beds. This appointment is recognised for the M.R.C.O.G., and may be a pre-registration appointment. Vacant 1st February, 1957.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 16th January, 1957.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for General Surgery. Recognised for the Final F.R.C.S. in general surgery, and recognised as a pre-registration appointment. Vacant 1st February, 1957.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 16th January, 1957.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. Required, SENIOR HOUSE OFFICER, duties to commence on 13th January, 1957. Salary and conditions of service in accordance with Ministry regulations. A furnished flat is available for married candidates, if required.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE PHYSICIAN, vacant on 1st March, 1957. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (casualty), duties to commence 31st January, 1957. Establishment 3. Recognised for F.R.C.S. Post offers wide experience of casualty work.

Applications, stating age, nationality, qualifications, and experience, together with copies of testimonials, to be sent to Secretary, General Hospital, Nottingham.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of Locum REGISTRAR in Department of Otolaryngology at the Radcliffe Infirmary, to commence as soon as possible, until end of April.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 21st January, 1957.

OXFORD. UNITED OXFORD HOSPITALS. The Radcliffe INFIRMARY, OXFORD. HOUSE PHYSICIAN required to the Nuffield Professor of Medicine at the Radcliffe Infirmary, for 6 months from 1st February, 1957. This post is recognised for pre-registration.

Applications, with names of 2 referees, to the Administrator, Radcliffe Infirmary, Oxford, by 17th January, 1957.

OXFORD. LITTLEMORE (MENTAL) HOSPITAL AND ASHHURST CLINIC. Applications invited for the post of SENIOR HOUSE OFFICER (Male or Female). Previous psychiatric experience unnecessary. The Physician appointed will work primarily in the Insulin Therapy Clinic and with a Senior Consultant at outpatient clinics. There are ample facilities for postgraduate study in a teaching general hospital. Salary £745 p.a.

Apply Physician-Superintendent.

PAISLEY AND DISTRICT HOSPITALS BOARD OF MANAGEMENT.

HOUSE SURGEON (pre-registration) required for Orthopædic and Fracture Unit, Royal Alexandra Infirmary, Paisley. Post vacant on 1st February, 1957.

JUNIOR HOSPITAL MEDICAL OFFICER required immediately for Casualty Department, Royal Alexandra Infirmary, Paisley. Resident or non-resident. Applicants must be registered for 1 year.

HOUSE OFFICER for Paisley and District Maternity Unit, as from 1st February, 1957. Applicants should preferably have held at least 1 previous House Officer post.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PETERBOROUGH. MEMORIAL HOSPITAL. Peter-BOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of HOUSE PHYSICIAN which will become vacant on 24th January, 1957. The appointment will be for 6 months.

Applications, with testimonials, should be addressed to the Secretary, Memorial Hospital, Peterborough.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Surgery, vacant 1st February, 1957. Recognised for the F.R.C.S. Greenbank Road Section.

HOUSE SURGEON (pre-registration post), vacant immediately. Recognised for the F.R.C.S. Freedom Fields Section.

HOUSE OFFICER in Obstetrics, vacant 14th March, 1957. Alexandra Maternity Home, Devonport.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to Deputy Group Secretary, Plymouth, South Devon and East Cornwall General Hospital Group, 7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. THE SCOTT ISOLATION HOSPITAL. PLYMOUTH SPECIAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER from Male registered medical practitioners who have preferably been qualified for 1 year, and have had previous hospital experience. The applicant should be able to drive a car. The duties, in 2 departments, will be chiefly in connection with infectious and venereal diseases, the former including a substantial proportion of cases in children. The varied clinical work, including acute medical and chest cases, provides valuable experience, particularly to those reading for a higher medical degree, or contemplating General Practice. The appointment will be for 1 year and there is an immediate vacancy. The post is non-resident but the successful candidate will be required to live near the Hospital and be on the telephone.

Applications, together with copies of 2 recent testimonials, should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. THE SCOTT ISOLATION HOSPITAL. HOUSE PHYSICIAN (resident), Male. Recognised pre-registration post which offers excellent experience.

Applications should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, Devon.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Portsmouth Hospital

HOUSE OFFICER (pædiatric and medical), 30 Beds. Pre-registration. Vacant 16th January.

Saint Mary's Hospital

HOUSE PHYSICIANS (pre-registration), 74 medical beds. 1 vacant 30th January, 1957; 2 vacant 31st January, 1957.

HOUSE SURGEONS (pre-registration), 130 surgical beds. 2 vacant 23rd January, 1957; 1 vacant 31st January, 1957; 1 vacant 1st February, 1957.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for MEDICAL REGISTRAR to the Portsmouth Group of hospitals.

Forms of application may be obtained from the Group Secretary, Portsmouth Group Hospital Management Committee, Saint Mary's Hospital, Portsmouth, which should be returned to him duly completed on or before 21st January, 1957. Canvassing will disqualify. Candidates are invited to visit the hospitals by arrangement.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of ANÆSTHETIC REGISTRAR in the Portsmouth Group, main duties at Queen Alexandra Hospital. 5 Consultant Anæsthetists practise in the Group. Post recognised for F.F.A.R.C.S.

Forms of application may be obtained from the Group Secretary, Portsmouth Group Hospital Management Committee, Saint Mary's Hospital, Milton, Portsmouth, which should be returned to him duly completed on or before 21st January, 1957. Canvassing will disqualify. Candidates may visit the above Hospital by arrangement with the Secretary of the Group.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bournemouth and East Dorset Hospital Management Committee. HOUSE SURGEON (Pre-registration Intern) required immediately. Post recognised for F.R.C.S. and F.R.C.S. Ed.

Applications to Hospital Secretary.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (Area Accident and Orthopædic Department), vacant immediately. Recognised for F.R.C.S. Duties including work in area Casualty Department at Battle Hospital, Reading (300 Beds). Person appointed will work with Registrar and House Officers.

Apply, stating nationality, present post and qualifications with dates, together with names of 2 referees, to Group Secretary, 3, Craven-road, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON (orthopædic) in the Area Accident and Orthopædic Department. Post vacant 14th February. F.R.C.S. recognised. Also casualty duties. Salary £425–£525 p.a., less £150 board-residence.

Apply, stating age, qualifications with dates, nationality, present post with 1 copy of recent testimonial, to Hospital Secretary.

ROCHDALE GROUP OF HOSPITALS invites applications from newly qualified medical practitioners for 1 year rotating PRE-REGISTRATION posts. The first 6 months will be spent as House Surgeons in the Rochdale Infirmary (2 months casualty, 4 months general surgery) and the second 6 months as House Physicians or Obstetric and Gynæcological House Surgeons.

Immediate application to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (neurosurgery) required from 18th January, 1957. Suitable for candidates seeking higher medical or surgical qualifications. Recognised for the F.R.C.S. (Eng.).

Apply to Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE PHYSICIANS (2) required from 24th February and 1st March, 1957. Open to either pre-registration applicants or to fully qualified practitioners.

Apply to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, by 26th January, 1957.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEONS (2) required from 16th and 24th February, 1957, in the General Surgical Unit. Recognised for F.R.C.S. Open to either pre-registration applicants or to fully qualified practitioners. This very active Unit of a total of approximately 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidate appointed will be attached to a unit of approximately 60 Beds.

Applications should reach the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, by 26th January, 1957.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT HOUSE OFFICER (general surgery) required from 25th January, 1957. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications should be forwarded immediately to Medical Superintendent stating also names of 2 referees.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male) required from 17th January, 1957. Post not approved for pre-registration purposes.

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

RYDE. ROYAL I.W. COUNTY HOSPITAL. Isle of Wight Group Hospital Management Committee. HOUSE SURGEON required for pre-registration post (salary £425 or £475 according to experience) or at Senior House Officer grading if registered (salary £745). Appointment recognised for F.R.C.S. Vacant late January.

Applications, with names of 2 referees, to Hospital Secretary immediately.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Medicine for duty within the Rheumatic Unit at the Northern General Hospital, Edinburgh. The Unit undertakes considerable amount of research work and preference will be given to candidates with some previous experience in the treatment of rheumatic disorders.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 2nd February.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR attached to the Professorial Unit of the Department of Tuberculosis and Diseases of the Respiratory System, University of Edinburgh. Applicants will be expected, in addition to clinical duties, to take part in teaching and research.

Apply, giving particulars of age, qualifications and experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 2nd February.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (274 Beds), AND SOUTHAMPTON GENERAL HOSPITAL (472 Beds). SENIOR HOUSE OFFICER (E.N.T.) required. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work. The Group includes a diagnostic and distributing Hearing Aid Centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) RESIDENT HOUSE SURGEON required beginning February. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GROUP OF HOSPITALS. South West Metropolitan Regional Hospital Board. Applications are invited for the post of REGISTRAR to the Geriatric Department of the above Group which is in the charge of a Consultant Physician. Unmarried quarters will be provided at one of the hospitals in the Group.

Forms of applications which may be obtained from the undersigned, should be returned not later than Wednesday, 23rd January, 1957.

FRANK JENNINGS, Group Secretary,
Southampton Group Hospital Management Committee,
Bullar-street, Southampton.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited for 2 appointments of RESIDENT ANÆSTHETIST (Senior House Officer grade). Posts vacant mid-March. The appointments are recognised as fulfilling the conditions of the F.F.A.R.C.S. and the D.A.

Applications, stating age, experience, and qualifications, with copies of 2 testimonials, should be sent to the undersigned not later than 24th January, 1957. J. C. FIELD, Secretary.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 19th February, 1957, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCUNTHORPE AND DISTRICT WAR MEMORIAL HOSPITAL. (262 Beds. Recognised for training for F.R.C.S.) Sheffield Regional Hospital Board. Whole-time RESIDENT REGISTRAR (orthopædics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 21st January, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SCUNTHORPE AND DISTRICT WAR MEMORIAL HOSPITAL. (262 Beds. Recognised for the F.R.C.S.) Sheffield Regional Hospital Board. Whole-time RESIDENT SURGICAL REGISTRAR required. Post vacant 1st April. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 21st January, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Scunthorpe Hospital Management Committee. HOUSE SURGEON (Senior House Officer grade) required mid-January. Modern well-equipped hospital offering good experience.

Applications, naming 2 referees, to Group Secretary.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the resident (pre-registration) post of HOUSE SURGEON (orthopædics), vacant immediately.

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to the Group Secretary, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD NO. 4 HOSPITAL MANAGEMENT COMMITTEE. SHEFFIELD REGIONAL HOSPITAL BOARD. RADIOTHERAPY SERVICES. Medical Men and Women desirous of taking up Radiotherapy are invited to apply for the post of RESIDENT RADIOLOGICAL OFFICER at Sheffield. The appointment will have the status of a Senior House Officer on a salary of £745 p.a. Approved courses for the D.M.R.T. (R.C.P. & S.) are held at the Sheffield National Centre for Radiotherapy and will be open to the successful candidate, facilities being given to attend these.

Applications for further particulars should be addressed to the Secretary, "Broom Cross," Tree Root-walk, Sheffield, 10.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS BOARD OF GOVERNORS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Reciprocal Training Scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in General Medicine required. Initial tenure at Derbyshire Royal Infirmary (416 Beds). Appointment for 1 year in first instance and renewable thereafter annually. Incumbent will be transferred to the Teaching Hospitals for the second phase of the appointment in accordance with arrangements under the Reciprocal Training Scheme. Renewal of appointment and transfer to the Teaching Hospitals will be subject to satisfactory work and progress.

Further details and form of application from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 21st January, 1957.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS BOARD OF GOVERNORS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Reciprocal Training Scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in General Medicine required. Initial tenure at Leicester Royal Infirmary (492 Beds). Appointment for 1 year in first instance and renewable thereafter annually. Incumbent will be transferred to the Teaching Hospitals for the second phase of the appointment in accordance with arrangements under the Reciprocal Training Scheme. Renewal of appointment and transfer to the Teaching Hospitals will be subject to satisfactory work and progress.

Further details and form of application from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 21st January, 1957.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS BOARD OF GOVERNORS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Reciprocal Training Scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in Anæsthetics required. Initial tenure at Nottingham City Hospital (811 Beds). Appointment for 1 year in first instance and renewable thereafter annually. Incumbent will be transferred to the Teaching Hospitals for the second phase of the appointment in accordance with arrangements under the Reciprocal Training Scheme. Renewal of appointment and transfer to the Teaching Hospitals will be subject to satisfactory work and progress.

Further details and form of application from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 21st January, 1957.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. CHILDREN'S HOSPITAL UNIT. Applications invited for the non-resident post of SENIOR REGISTRAR in Pædiatrics at the above Hospital.

Applications, stating age, qualifications and experience, with the names of 3 referees, should be sent not later than 16th January, 1957, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the post of ANÆSTHETIC REGISTRAR. Post vacant 24th February, 1957. The successful candidate will be required to work in any of the Units of the United Sheffield Hospitals.

Applications, with the names of 3 referees, should be sent not later than 25th January, 1957, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. WHARNCLIFFE HOSPITAL. (130 Beds.) SENIOR HOUSE OFFICER (surgery and orthopædic), non-resident; also HOUSE OFFICER (surgery), resident, vacant from 15th January, 1957.

Applications, with copy testimonials, to Group Secretary, Sheffield No. 2 Hospital Management Committee, Middlewood Hospital, Sheffield, 6.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer). Post recognised for F.F.A.R.C.S. Registrar also employed. Vacant end of January.

Applications and copy testimonials to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

ST. ALBANS (near). SHENLEY HOSPITAL. Applications are invited for the post of PSYCHIATRIC REGISTRAR (resident or non-resident), for 1 year in the first instance, at Shenley Hospital, 2360 Beds (16 miles from London). Opportunity for work with neurotic and psychotic patients. Full facilities for training. The Hospital may be visited by appointment.

Application forms obtainable from, and returnable to, Secretary, Shenley Hospital, near St. Albans, Herts, by 3rd February, 1957.

ST. ALBANS CITY HOSPITAL. (384 Beds.) North West METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time ANÆSTHETIC REGISTRAR required. Post recognised for F.F.A.R.C.S. and D.A. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Herts, by 21st January, 1957.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) Locum Tenens ANÆSTHETIC REGISTRAR (resident) required for the period 8th–21st February, 1957. Post recognised for F.F.A.R.C.S. and D.A.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. HELENS AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. ST. HELENS HOSPITAL. (196 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON, which becomes vacant from 1st March, 1957. The post is recognised for Pre-registration Service.

Applications, stating age, date of qualification and experience, and giving 2 names for reference, should be forwarded to—

N. RICHARDS, Group Secretary.

Whiston Hospital, Prescot, Lancs.

ST. HELENS AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. WHISTON HOSPITAL, PRESCOT. (892 Beds.) Applications are invited for the appointment of RESIDENT ANÆSTHETIST at the above Hospital. The post is in the Senior House Officer grade, and is recognised for training for the Fellowship of the Faculty of Anæsthetists.

Applications, stating age, qualifications, and experience, and giving 2 names for reference, should be sent to the undersigned immediately. N. RICHARDS, Secretary.

Group Office, Whiston Hospital, Prescot.

STOKE-ON-TRENT HOSPITAL MANAGEMENT COM-MITTEE. RESIDENT ASSISTANT CLINICAL PATHOLOGIST to the Stoke-on-Trent Group of hospitals, vacant shortly. Single accommodation at North Staffordshire Royal Infirmary. The post is Junior Hospital Medical Officer status, but applicants with less than 2 years qualification period will be considered in the grade of Senior House Officer. Exceptional experience in hospital laboratory work. Recognised for D.C.P. and Diploma in Pathology.

Detailed applications, with particulars of previous appointments held (2 testimonials), to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (ophthalmology) required. Recognised F.R.C.S. and D.O.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology) required—vacant shortly. Pre-registration post. Recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications to Hospital Management Committee Secretary, Princes-road, Stoke-on-Trent, as soon as possible.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum SENIOR SURGICAL REGISTRAR required 4th–16th February.

Applications, with 2 testimonials, to Secretary.

SULLY HOSPITAL, Sully, Penarth, Glamorganshire. (Thoracic Centre—324 Beds.) SENIOR HOUSE OFFICER (medical), required commencing 14th January, 1957. Experience available in investigation and treatment of all lung and heart diseases in adults and children.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

SUNDERLAND AREA HOSPITAL MANAGEMENT COMMITTEE. RESIDENT ANÆSTHETIST is required for duties at hospitals in the above Group, Senior House Officer grade. Post vacant immediately. The post offers good practical experience under the supervision of the visiting Anæsthetists. The hospitals are recognised for the F.F.A.R.C.S. and the D.A. In addition every opportunity is given to attend lectures at the neighbouring University 12 miles away.

Apply to the Group Secretary, Sunderland Area Hospital Management Committee, General Hospital, Sunderland, naming 2 referees.

SWANSEA HOSPITAL, Swansea. (430 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Pre-registration HOUSE OFFICER in the Surgical Unit of the above Hospital. Post vacant on 1st February, 1957.

Applications with full particulars should be addressed to the Hospital Secretary. T. E. JONES, Group Secretary.

SWANSEA. MORRISTON HOSPITAL. (501 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the resident appointment of SENIOR HOUSE OFFICER in the Anæsthetic Department of the above Hospital. The post is recognised for F.F.A.R.C.S. and D.A.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent to the Medical Superintendent of the Hospital.

T. E. JONES, Group Secretary.

WAKEFIELD. THE GENERAL HOSPITAL, Park Lodge-lane, WAKEFIELD. (158 Beds.) HOSPITAL MANAGEMENT COMMITTEE NO. 9 WAKEFIELD A GROUP. HOUSE PHYSICIAN (general medical and geriatrics) required at the above Hospital. This is a pre-registration post and is vacant on 1st February, 1957. Salary and conditions of service in accordance with national recommendations.

Applications to Group Secretary, 113, Northgate, Wakefield.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT CASUALTY OFFICER (Male or Female), vacant 1st February. The post is graded Junior Hospital Medical Officer. Scale of salary £775 by £50 rising to £1075, less a deduction of £170 for residential emoluments. Applications will also be considered from Junior Medical Officers who would be graded House Officer or Senior House Officer at the scale appropriate to the experience of the applicant. Consideration will also be given to applicants who desire the appointment on a short-term basis. A whole-time Senior Hospital Medical Officer is in charge of the department.

Applications, stating age, experience and qualifications, should be forwarded or telephoned to—

HENRY L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.
(Tel. No.: Warrington 1666).

WARWICK (near). KING EDWARD VII MEMORIAL CHEST HOSPITAL, HERTFORD HILL, near WARWICK. JUNIOR HOSPITAL MEDICAL OFFICER (resident). Applications are invited for this appointment in a modern Thoracic Surgical Unit. All forms of major and minor thoracic surgery undertaken. Post offers wide general training in non-tuberculosis and tuberculosis surgery. Facilities available for postgraduate study. Previous experience in specialty is not essential.

Applications to Group Secretary, 50, Holly-walk, Leamington Spa.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. CASUALTY OFFICER (Senior House Officer). Modern Department employing 3 full-time Casualty Officers. Post recognised for F.R.C.S. Resident or non-resident. Vacant mid-February.

Applications, with names of 2 referees, to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) ORTHOPÆDIC HOUSE SURGEON (with certain casualty duties) required. Post recognised for F.R.C.S.(Eng.) examination. Intermediate or Senior post, depending on experience, for Orthopædic Unit (30 Beds). The Orthopædic Service is in charge of a Consultant and Registrar closely associated with a Postgraduate Teaching Hospital.

Applications, with copies of 2 testimonials, to the Administrator.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (313 Beds.) HOUSE SURGEON to the Senior Surgeon. Post vacant immediately.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (313 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant 27th February.

Applications, with copies of 2 testimonials, to the Group Secretary.

WELSH REGIONAL HOSPITAL BOARD. Registrar (orthopædics), Royal Gwent Hospital, Newport. Separate Fracture and Orthopædic Unit (36 Beds). Own Outpatient, X-ray, and Rehabilitation Departments. Non-resident. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTON-SUPER-MARE GENERAL HOSPITAL. CASUALTY OFFICER (Senior House Officer grade) required 1st February, 1957, for the above Hospital. The appointment is recognised for F.R.C.S. examinations.

Applications, stating age, qualifications, and experience, together with the names and addresses of 2 referees, should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee.

WICKFORD (near), ESSEX. RUNWELL HOSPITAL. (1032 Beds.) SENIOR HOUSE OFFICER (Male or Female) required for 1 of the Consultant's Divisions and to assist in outpatient work. Excellent postgraduate facilities for D.P.M. Salary £745 : residential charge £150.

Applications, with copies of testimonials, to the Secretary.

WOKING AND CHERTSEY GROUP HOSPITAL MANAGEMENT COMMITTEE. GROUP PATHOLOGY LABORATORY. REGISTRAR required from April for duty in Group Laboratory situated at St. Peter's Hospital, Chertsey ; laboratory may be visited by arrangement with Director (Ottershaw 438).

Application forms from Secretary, Woking and Chertsey Group Hospital Management Committee, "Huntington," Guildford-road, Chertsey, Surrey. Closing date 26th January.

WREXHAM (near). TREVALYN MANOR MATERNITY HOSPITAL, ROSSETT, near WREXHAM. (47 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st February, 1957. The Hospital is recognised by Central Midwives Board as a Part II Midwifery Training School and deals with normal and abnormal midwifery.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st February, 1957. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications, and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of PÆDIATRIC HOUSE PHYSICIAN at the above Hospital, to commence 1st February, 1957. The appointment is recognised for the D.C.H. and for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st February, 1957. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications, and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS.

Vacancies in Surgery occur shortly.

Applications, with copies of testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) SENIOR HOUSE OFFICER (anæsthetics). Post vacant shortly. Recognised for D.A. and F.F.A.R.C.S.

Apply Secretary with copies of testimonials.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for the post of HOUSE OFFICER (post-registration) at the above-named Hospital, which is a general teaching Hospital of 300 Beds approved by the University of London for its degrees. Duties to commence as early as possible will include 6 months general relieving duties. Salary is payable at the rate of £750 p.a. and single accommodation and board are provided at a deduction of £125 p.a. Return passages by sea will be provided for 1 person only.

Applications, stating age, nationality, and details of qualifications and experience, together with 3 recent testimonials, should be addressed to the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona P.O., Jamaica, B.W.I., as early as possible.

YORK. THE COUNTY, CITY, MILITARY (Civilian Wing), FULFORD HOSPITALS. (General hospitals of 269, 256, 60 and 149 beds respectively, with full Consultant staff.) SENIOR HOUSE OFFICER in Anæsthetics, resident or non-resident, required 8th February, 1957. Recognised for F.F.A.R.C.S. and D.A. Previous experience desirable but not essential.

Applications, stating age, nationality, qualifications, experience and names of 2 referees, to Group Secretary, Bootham Park, York.

YORK. NABURN AND BOOTHAM PARK HOSPITAL. YORK A AND TADCASTER HOSPITAL MANAGEMENT COMMITTEE. A vacancy exists for a JUNIOR HOSPITAL MEDICAL OFFICER in Psychiatry at this Hospital of 630 Beds with an annual admission-rate of over 570 (including Health Service, Amenity and Private categories) and offering good all-round experience in psychiatry. Previous experience in the subject is not essential, but preference will be given to applicants who wish to take the D.P.M. Facilities for attending the University of Leeds Courses are available. The 2 branches of the Hospital are an integral part of the York Comprehensive Mental Health Service with its associated outpatient facilities. The post may be resident or non-resident.

The Hospital may be seen by appointment with the Physician-Superintendent, Bootham Park, York, to whom applications should be addressed, with details of career and the names of 3 referees ; closing date 8th February, 1957.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in Psychiatry at Downshire Hospital, Downpatrick (a mental hospital). The terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44/46, Queen-street, Belfast, and to be returned not later than 31st January, 1957.

NORTHERN IRELAND HOSPITALS AUTHORITY invite applications for a whole-time post as Locum Tenens REGISTRAR in Psychiatry at Holywell Hospital, Antrim (a mental hospital) from mid-February, 1957.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44/46, Queen-street, Belfast, and to be returned not later than 28th January, 1957.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in Anæsthetics at hospitals managed by the Belfast Hospital Management Committee. The terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 26th January, 1957.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as SENIOR HOUSE OFFICER in Clinical Pathology at Brooke Park Laboratory, Londonderry. The terms and conditions will be in accordance with the Authority's application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 26th January, 1957.

CANADA. GRACE HOSPITAL, Winnipeg, Manitoba, CANADA, has vacancies for RESIDENCIES and SENIOR INTERNSHIPS. Salary $150 per month plus room and board. Uniforms and laundry provided. Grace Hospital is an active general hospital of 230 Beds with approximately 9128 discharges per year.

Applicants with credentials are invited.

CANADA. REDDY MEMORIAL HOSPITAL, Tupper-street, WESTMOUNT, MONTREAL. British graduates required as JUNIOR INTERNES from June, 1957. Salary $100 per month, with full board and lodging. Also ; RESIDENT in Medicine, Salary $225.

Apply : Executive Director.

NEW YORK. ALBANY HOSPITAL, Albany, New York, U.S.A. PSYCHIATRY RESIDENCIES available in 655-Bed University-teaching General Hospital with 60-Bed acute treatment Psychiatric Unit fully approved for 3 years training. Experience includes dynamically-oriented psychotherapy with children and adults, shock therapies, and neurologic training. Salary range $3000–$4000 annually.

Address inquiries to Medical Director.

NEW YORK. NEW ROCHELLE HOSPITAL, New ROCHELLE, NEW YORK, U.S.A. (360-Bed general community hospital.) Approved by the Joint Commission on Accreditation of Hospitals. Also approved by the American College of Surgeons and American Medical Association for Internship and Residency training. Only graduates from approved university schools accepted. INTERNESHIPS available for the 1 year term commencing 1st July, 1957. Stipend is $200 per month plus complete maintenance. Passage back to England paid by Hospital after completion of 12-month Internship.

Apply Superintendent.

U.S.A. MIRIAM HOSPITAL, 164, Summit-avenue, PROVIDENCE 6, RHODE ISLAND, U.S.A. INTERNSHIP. For 1st July, 1957, appointment. 150-Bed, voluntary general hospital. U.S. Department of State's Exchange Visitor Programme P-1514. 1-year Internship. Approved by American Medical Association (pre-requisite for specialty residency). Internship rotates trainee through supervised services in medicine, surgery, obstetrics, pædiatrics, anæsthesia, pathology and radiology. Remuneration $200 per month, plus full maintenance, 2 weeks paid vacation. The education programme of this Hospital is conducted by Alex. M. Burgess, M.D., SC.D., F.A.C.P., Director of Professional Education.

Write air-mail to I. HERBERT SCHEFFER, M.D., Executive Director, for application blank and detailed information.

U.S.A. PITTSFIELD GENERAL HOSPITAL, Pittsfield, MASS., U.S.A. RESIDENT in Pathology. 200-Bed hospital with well-equipped laboratory in beautiful, congenial part of New England. Summer and winter sports. English Pathologist. Medical school appointment available. Salary $300 monthly. Passage paid.

Apply air-mail Dr. W. BEAUTYMAN, Pathologist.

U.S.A. ELMHURST GENERAL HOSPITAL, Elmhurst, NEW YORK, U.S.A. (960 Bed general municipal hospital, formerly, New York City Hospital.) Approved by the Joint Commission on Accreditation of Hospitals. Also approved by the American College of Surgeons and American Medical Association for Internship and Residency training. Only graduates from approved university schools accepted. Several openings in Rotating and Straight INTERNESHIPS and a few first and second year RESIDENCIES are available for the term commencing 1st July, 1957. Stipend for Internes is $855 per year plus complete maintenance.

Apply to Chairman of Interne and Resident Committee.

U.S.A. ST. ELIZABETH HOSPITAL, Elizabeth, New JERSEY, U.S.A. Applications are invited for 12 months ROTATING INTERNSHIP; July or January term.

Write Administrator.

Public Appointments

ATOMIC ENERGY RESEARCH ESTABLISHMENT. HARWELL. A MEDICAL OFFICER is required by the United Kingdom Atomic Energy Authority for work at the above Establishment in the first instance. Experience in industrial medicine, outpatient and general practice, a Diploma in Industrial Health will be advantageous. Commencing salary £1850 at 37 years of age (there would be some reduction for a younger officer), rising to £2300 p.a.

Send postcard for further details and an application form, which must be returned by 22nd January, 1957, to Establishment Officer, Atomic Energy Research Establishment, Harwell, Didcot, Berks, quoting reference 695 75.

DERBYSHIRE COUNTY COUNCIL. County Health DEPARTMENT. SENIOR MEDICAL OFFICER FOR MENTAL HEALTH. Applications are invited from registered medical practitioners for this whole-time superannuable post. Experience in dealing with educationally subnormal children and mental defectives is necessary for carrying out the duties. The possession of a Diploma in Public Health or in Psychological Medicine would be regarded as an important additional qualification. Salary £1520–£50 (1) and £55 (7)–£1955 p.a. Car allowance.

Particulars and application forms obtainable from Dr. J. B. S. MORGAN, County Medical Officer, St. Mary's-gate, Derby, to whom they should be returned by 28th January, 1957.

DERBYSHIRE COUNTY COUNCIL. County Health DEPARTMENT. MATERNITY AND CHILD WELFARE MEDICAL OFFICER (Female). Applications are invited from fully qualified medical practitioners for this whole-time superannuable post. Candidates should be experienced in antenatal work, midwifery, and children's diseases, as they will be required to hold consultations at the Council's Maternity and Child Welfare Clinics and Centres, and to perform such other duties as may be required. Salary £1050–£50–£1200–£55–£1475 p.a., plus a car allowance.

Particulars and application forms are obtainable from Dr. J. B. S. MORGAN, County Medical Officer, St. Mary's Gate, Derby, and should be returned to him duly completed not later than 31st January, 1957.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
POPLAR ..	..LONDON ..	26TH JANUARY, 1957

LANCASHIRE COUNTY COUNCIL. Applications are invited from registered medical practitioners for appointment as ASSISTANT DIVISIONAL MEDICAL OFFICERS. Vacancies in areas around Lancaster, Swinton and Pendlebury and Bolton. Possession of Diploma in Public Health desirable. Salary £1050, rising to £1475 p.a. Travelling and subsistence allowances.

Application forms and further particulars from County Medical Officer, Serial 3, East Cliff County Offices, Preston. Application forms to be returned by 2nd February, 1957.

MIDDLESBROUGH. COUNTY BOROUGH OF MIDDLES-BROUGH. ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER required. Applicants must be registered medical practitioners holding the D.P.H. or equivalent and previous experience in public health or in general practice desirable. Work is under the direction of the Medical Officer of Health and will be mostly administrative and partly inspectorial including port health. Salary £1050–£50(3)–£55(5)–£1475 p.a.

Applications, with names of 3 referees, to the Medical Officer of Health, 26, Southfield-road, Middlesbrough.

GOVERNMENT OF BRITISH GUIANA. Junior Ophthal-MOLOGIST required to assist in treatment of eye diseases at Public Hospital, Georgetown, and other hospitals as required and to be responsible for indoor and outdoor patients. Other duties include special inspections of school children and holding of clinic sessions at District Hospitals. Candidates must hold D.O.M.S. registrable in United Kingdom or F.R.C.S. (Eye) and have been actively engaged during past 3 years. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service; or on contract for 3 years resident service with gratuity (taxable) of 22½% of salary for each 3 months service. Candidates from National Health Service may retain superannuation rights during service abroad (up to 6 years) and receive gratuity (taxable) of 20% of their salary on leaving oversea employment. Salary £1600 a year plus non-pensionable allowance of £250 a year in lieu of consultation fees. Free unfurnished quarters or an allowance of £100 a year in lieu. Generous home leave. Free passages on appointment for Officer, wife, and children under 18 years, not exceeding 5 persons in all. Assisted passages for Officer and wife on leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/30/020).

GOVERNMENT OF BRITISH GUIANA. Applications invited for following posts:—

(1) MEDICAL OFFICERS for general medical duties. Salary scale £950–£1450 a year, starting salary according to qualifications and experience.

(2) PATHOLOGIST for New Amsterdam and Mental Hospitals to have charge of Laboratory staff, buildings, and equipment: to supervise laboratories of Government Hospitals and be responsible for training of Laboratory Technicians. Salary £1600 a year plus non-pensionable allowance of £250 a year in lieu of consultation fees. Private practice not permitted.

Appointments on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service; or on contract for 3 years resident service with gratuity (taxable) of 22½% of salary for each 3 months service. Candidates in National Health Service may retain their superannuation rights during service abroad (up to 6 years) and receive gratuity (taxable) of 20% of the aggregate of their salary on leaving oversea employment. Free unfurnished quarters or an allowance of £100 a year in lieu. Generous leave. Free passages on appointment for Officer, wife, and children under 18 years, not exceeding 5 persons in all. Assisted passages for Officer and wife on leave. Income-tax at local rates. Candidates must possess medical qualifications registrable in the United Kingdom including, for the pathological vacancy, a Diploma in Pathology or Bacteriology.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/30/01).

NATIONAL COAL BOARD (South-Western Division) invite applications for the post of AREA MEDICAL OFFICER in their No. 4 (Aberdare) Area. Applicants must be registered medical practitioners and have had a good clinical background. Previous experience in general practice and industry and a knowledge of the coal industry would be advantageous. The successful applicant will be responsible for the supervision of industrial health services in the Area, including the examination of new entrants and will be required to live in, or near the Area. Salary range £1400–£2150 p.a.

Full particulars of age, qualifications, experience and positions held, should be sent to the Divisional Chief Staff Officer, National Coal Board, Cambrian Buildings, Mount Stuart-square, Cardiff, by 31st January, 1957.

NAVY, ARMY AND AIR FORCE INSTITUTES. Applications are invited from medical practitioners (Male and Female) for part-time appointments as ASSISTANT MEDICAL OFFICERS at the London Headquarters of this Corporation. Candidates should have considerable experience of general medicine including experience in general practice. Remuneration will be in accordance with B.M.A. salary scale for Industrial Medical Officers.

Applications, stating age, qualifications and experience, should be sent to Chief Medical Officer, Navy, Army and Air Force Institutes, Imperial Court, Kennington-lane, London, S.E.11, before 26th January.

NORFOLK. COUNTY OF NORFOLK. The Norfolk County Council and the County District Councils concerned invite applications from registered medical practitioners holding the Diploma in Public Health for the whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND DISTRICT MEDICAL OFFICER OF HEALTH for Area No. 7 comprising Downham Market Urban District, Downham Rural District and Marshland Rural District, with a total population of approximately 43,000. The person appointed will be employed for seven-elevenths of his time as Assistant County Medical Officer and four-elevenths as District Medical Officer of Health. He will act as an Assistant County Medical Officer under the direction of the County Medical Officer and as District Medical Officer of Health he will be subject to the instructions of the District Councils concerned. The combined salary scale will be £1646 rising to a maximum of £1917 p.a. Travelling and subsistence expenses will be paid in accordance with the County Council's scales.

Application forms, together with further particulars of the appointment, can be obtained from the County Medical Officer, 29, Thorpe-road, Norwich, to whom completed application forms should be returned not later than 21st January, 1957.

OLDHAM. COUNTY BOROUGH OF OLDHAM. Applications are invited from registered medical practitioners for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER, which affords an excellent opportunity for obtaining experience in the Public Health and School Health Services. Salary £1050–£50–£1200–£55–£1475 p.a. The point of entry will be fixed according to qualifications and experience. The appointment is superannuable and subject to medical examination.

Applications, stating age, qualifications and experience, should be forwarded to the Medical Officer of Health, Public Health Department, Town Hall, Oldham, together with copies of 2 testimonials, or the names of 2 persons to whom reference may be made. EDWARD HAINES, Town Clerk.

YORK. CITY OF YORK EDUCATION COMMITTEE. SCHOOL HEALTH SERVICE. Applications are invited from Male registered medical practitioners for the permanent post of ASSISTANT SCHOOL MEDICAL OFFICER. Applicants will be required to devote their whole-time to the duties of the office. Preference will be given to those who have had special experience of diseases of children. The salary offered is in accordance with the Whitley Council scales—i.e., £1050–£50–£1200–£55–£1475 p.a. The appointment will be subject to the Local Government Superannuation Acts and to the passing of a medical examination.

Form of application and conditions of appointment may be obtained from the undersigned on receipt of a stamped addressed envelope, and should be returned by 25th January, 1957.

H. OLDMAN, Chief Education Officer.

Education Offices, 5, St. Leonard's-place, York.

SWINDON. BOROUGH OF SWINDON. Appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Applications are invited from duly qualified medical practitioners holding a Diploma in Public Health or similar qualification, for the appointment of Deputy to the Medical Officer of Health and Principal Borough School Medical Officer, who is also Area Medical Officer under the Wiltshire County Council. The salary is at the rate of £1396 4s. 3d. p.a., rising by 2 increments of £60, 2 of £57 14s. 7d. and 1 of £31 16s. 5d. to a maximum of £1663 9s. 10d. p.a.

Applications, together with the names of 3 persons to whom reference may be made, must be submitted to the Town Clerk, Civic Offices, Swindon, by 28th January, 1957. Further particulars will be supplied on request.

WESTERN AUSTRALIA. STATE PUBLIC SERVICE. MENTAL HEALTH SERVICES. MEDICAL OFFICER (Child Guidance Clinic).

Salary range: £A2537–£A2607 (gross) p.a., plus £100 if in possession of a Diploma in Psychiatry.

Qualifications: candidates must possess a medical degree registrable in Western Australia. Preference will be given to candidates intending to specialise in child psychiatry who have had some experience in this field and who possess a postgraduate qualification in psychiatry and/or paediatrics.

Transport: a reasonable amount will be allowed for transport of appointee and dependent family to Western Australia provided bond entered into to serve State for a period of at least 3 years.

Conditions of service: superannuation benefits; long service leave (3 months on full pay after each 7 years of continuous service); cumulative sick leave and other benefits applicable to permanent public servants.

Applications in duplicate, stating age, marital status, qualifications and experience, should be addressed by 2nd February, 1957, to Official Secretary, Agent General for W.A., Savoy House, Strand, London, W.C.2.

WESTERN REGION OF NIGERIA. Specialist Obstetrician required for obstetrical and gynaecological duties, including outpatient, maternity, child welfare, and antenatal work in the larger provincial hospitals of the Region (which are being enlarged up to 200 Beds), and to assist in training midwives. Candidates should have registrable medical qualifications and the M.R.C.O.G., with considerable experience of major surgery in their specialty, and have had at least 6 years post-registration experience.

Appointment may be:—

(*a*) From the National Health Service, candidate retaining superannuation rights up to 6 years and receiving a gratuity (taxable) of 20% of aggregate of salary, or

(*b*) On short-term contract (1 tour in first instance of 12–24 months duration according to age).

Salary under (*a*) £2220 a year, and (*b*) £2448 and gratuity (taxable) on satisfactory completion of contract at rate of £37 10s. for each completed period of 3 months service (including leave). Officer appointed under (*b*) required to contribute to Widows' and Orphans' Pension Scheme.

Quarters provided at low rental. Taxes at local rates. Annual leave permissible: generous home leave granted after each tour of 18–24 months. Free return passages for Officer, wife, and children (up to 3).

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/410/06).

Gen ral Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the Council. Mark envelope "Vacancy."

HORNSEY. Applications invited for Vacancy, previously carried on by a lady doctor. List at present approximately 1600. Intermediate area. Premises available for purchase or rent. Apply on Form E.C.16A before 19th January, 1957, to the Clerk, Middlesex Executive Council, Gloucester House, Gloucester Gate, London, N.W.1.

GOOLE. Applications are invited for a Vacancy at Goole (urban). List at present 3043. Residence and surgery for sale. Apply on Form E.C.16A to the undersigned not later than 19th January, 1957. Further particulars available to applicants on request.

C. H. STABLER, Clerk of the West Riding Executive Council.
5, St. John's-north, Wakefield.

KEIGHLEY. Applications are invited for a Vacancy at Keighley (urban) in consequence of the resignation of husband and wife who practised in partnership, their lists at present being 1877 and 1814 respectively. Residence and surgery for sale. Apply on Form E.C.16A to the undersigned not later than 26th January, 1957. Further particulars available to applicants on request.

C. H. STABLER,
Clerk of the West Riding Executive Council.
5, St. John's-north, Wakefield.

WORCESTERSHIRE, OLDBURY, near BIRMINGHAM. Urban VACANCY due to retirement on 31st March, 1957. List 2942. Residence and surgery may be available. Closing date 19th January, 1957. E.C.16A and full written details from the Clerk, Worcestershire Executive Council, 29, Foregate-street, Worcester.

Hospital Services : Non-Medical Appointment

SOUTH CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. BIOCHEMIST for Group Laboratory Service required. Whitley Council salary scales, and Conditions of Service.

Apply immediately to the Group Secretary, Barony Hospital, Nantwich, stating age, qualifications and experience, and giving the names of 3 referees.

Appointment : Too Late for Classification

GLASGOW, S.W.1. SOUTHERN GENERAL HOSPITAL. SENIOR HOUSE OFFICER in Pathology.

Write to Secretary, Board of Management for Glasgow South-Western Hospitals, 1301, Govan-road, Glasgow, S.W.1, naming 2 referees.

Miscellaneous

Pharmaceutical Director. A well-known British Group with extensive Medical, Surgical and Pharmaceutical interests invites applications from men of suitable experience to develop its interests in the pharmaceutical field. The applicant should be aged between 35 and 45 years, and in addition to wide commercial experience must be qualified in chemistry, pharmacy or medicine. The appointment is at Board level, at which he will be required to collaborate closely with the Research Organisation of the Group.

Full particulars to: Address, No. 271, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Diagnostic Radiologist wishes to join another sharing rooms in Harley-street area.—Address, No. 272, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Cumberland-place, Marble Arch. Consulting-rooms with service and waiting-room. Permission to share.—AMB. 3746, or write ULLMANN, 34, Southwick-street, London, W.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moder-ate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

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Enquiries are invited from physicians (M.D. or M.R.C.P. an advantage) who have experience of originating or conducting clinical trials of new drugs. They must also have a flair for weighing technical, professional and commercial viewpoints and provide evidence of an imaginative and constructive approach. Salary according to reputation, but will interest those at present earning £3000 or more.

Please send brief details in strict confidence to R. A. DENERLEY (AN.241), Management Selection Ltd., 17, Stratton-street, London, W.1. No information will be passed to our clients without candidates' permission after full personal discussion at which the identity of the Company will be disclosed.

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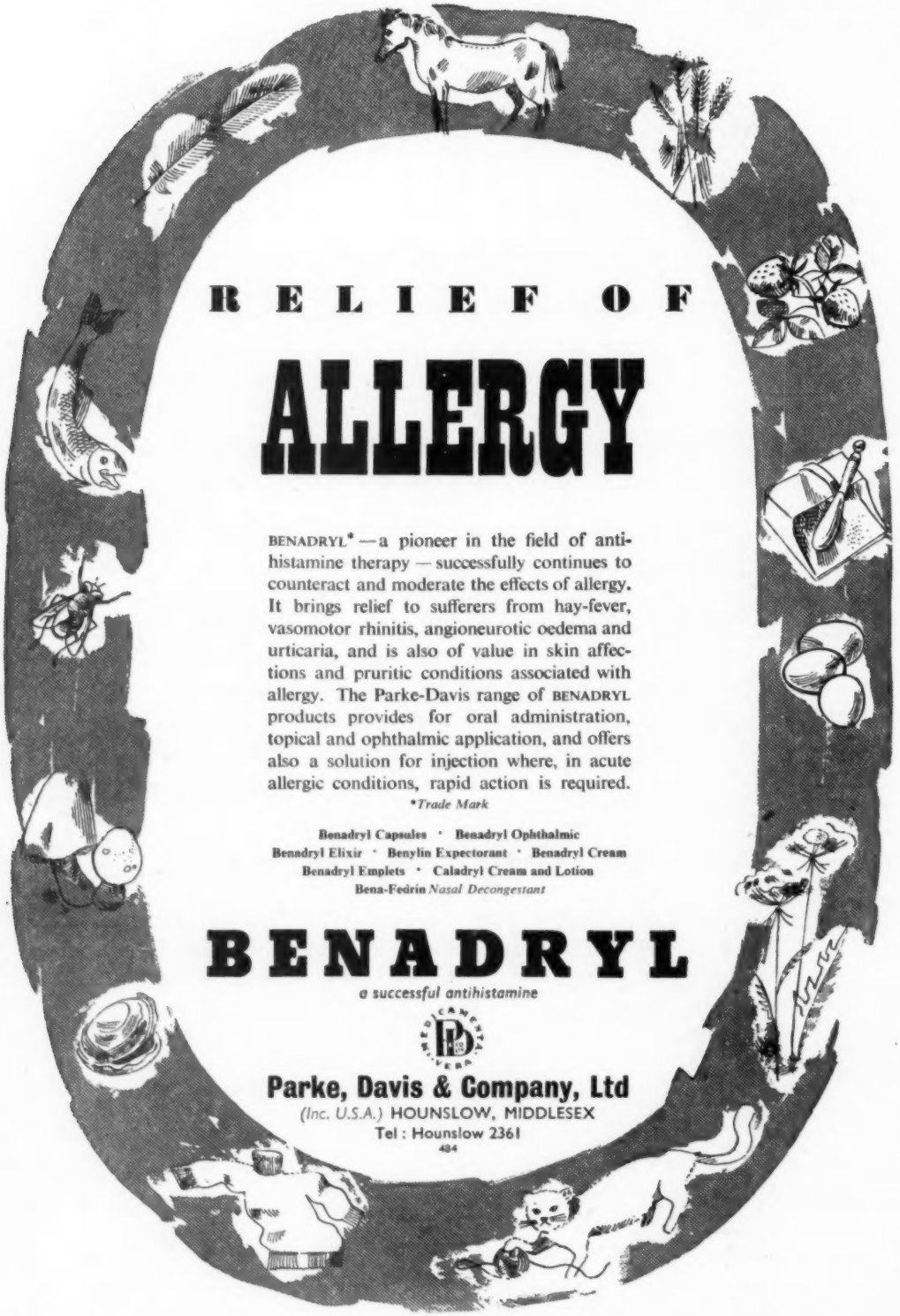

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